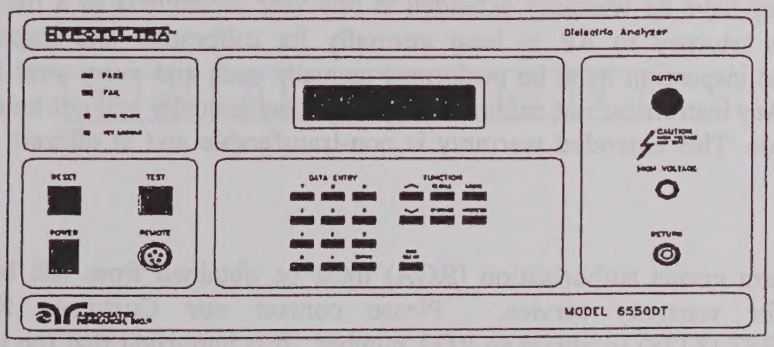
ASSOCIATED RESEARCH, INC.

OPERATION AND SERVICE MANUAL

MODEL 6550DT



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Item # 37483

5 YEAR WARRANTY POLICY

Associated Research, Inc., certifies that the instrument listed in this manual meets or exceeds published manufacturing specifications. This instrument was calibrated using standards that are traceable to the National Institute of Standards and Technology (NIST).

Your new instrument is warranted to be free from defects in workmanship and material for a period of (1) year from date of shipment. You must return the "Owners Registration Card" provided within (15) days from receipt of your instrument.

AR recommends that your instrument be calibrated on a twelve month cycle. This instrument may have its warranty extended in one year increments to a maximum of **(5) years** provided it is returned to AR at least **annually** for calibration and inspection. The annual calibration and inspection must be performed annually each and every year following receipt of instrument. Any instrument not calibrated and inspected annually will not be eligible for extended warranty status. This extended warranty is non-transferable and is offered only to the original purchaser.

A return goods authorization (RGA) must be obtained from AR before returning this instrument for warranty service. Please contact our Customer Support Center at 1-800-858-TEST (8378) to obtain an RGA number. It is important that the instrument is packed in its original contained for safe transport. If the original container in not available please contact our customer support center for proper instructions on packaging. Damages sustained as a result of improper packaging will not be honored. Transportation costs for the return of instrument for warranty service must be prepaid by the customer. AR will assume the return freight costs when returning the instrument to the customer. The return method will be at the discretion of Associated Research.

Except as provided herein, Associated Research makes no warranties to the purchaser of this instrument and all other warranties, express or implied (including, without limitation, merchantability or fitness for a particular purpose) are hereby excluded, disclaimed and waived.

Any non-authorized modifications, tampering or physical damage will void your warranty. Elimination of any connections in the earth grounding system or by-passing any safety systems will void this warranty. This warranty does not cover batteries or accessories not of Associated Research manufacture. Parts used must be parts that are recommended by AR as an acceptable specified part. Use of non-authorized parts in the repair of this instrument will void the warranty.

OPERATION AND SERVICE MANUAL

MODEL 6550DT HypotULTRA ™

AC/DC HIPOT WITH INSULATION RESISTANCE TESTER AND IEEE-488 (GPIB) INTERFACE

SERIAL NUMBER

0	0	9	4	0	6	3	3

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TABLE OF CONTENTS

SECTION I OPERATORS MANUAL 1

SAFETY 2

INTRODUCTION 6

SPECIFICATIONS 11

CONTROLS 17

INSTALLATION 23

QUICK START 26

OPERATION 29

OPTIONS 47

SECTION II SERVICE MANUAL 49

CALIBRATION 50

PARTS LIST 54

SCHEMATICS 55

SECTION 1
OPERATORS MANUAL

SAFETY PRECAUTIONS REQUIRED FOR HIGH VOLTAGE TESTING!

GENERAL:

This product and its related documentation must be reviewed for familiarization with safety markings and instructions before operation.

This product is a Safety Class I instrument (provided with a protective earth terminal).

Before applying power verify that the instrument is set to the correct line voltage (110 or 220) and the correct fuse is installed.

INSTRUCTION MANUAL SYMBOL. PLEASE REFER TO THE INSTRUCTION MANUAL FOR SPECIFIC WARNING OR CAUTION INFORMATION TO AVOID PERSONAL INJURY OR DAMAGE TO THE PRODUCT.

INDICATES HAZARDOUS VOLTAGES MAY BE PRESENT.

CHASSIS GROUND SYMBOL.

WARNING

CALLS ATTENTION TO A PROCEDURE, PRACTICE, OR CONDITION, THAT COULD POSSIBLY CAUSE BODILY INJURY OR DEATH.

CAUTION

CALLS ATTENTION TO A PROCEDURE, PRACTICE, OR CONDITION, THAT COULD POSSIBLY CAUSE DAMAGE TO EQUIPMENT OR PERMANENT LOSS OF DATA.

A Hipot produces voltages and currents which can cause **harmful or fatal electric shock.** To prevent accidental injury or death, these safety procedures must be strictly observed when handling and using the test instrument.

SERVICE AND MAINTENANCE

User Service

To prevent electric shock do not remove the instrument cover. There are no user serviceable parts inside. Refer servicing to an Associated Research, Inc. authorized service center. Schematics, when provided, are for reference only.

Service Interval

The instrument and its power cord, test leads, and accessories must be returned at least once a year to an Associated Research authorized service center for calibration and inspection of safety related components. Associated Research will not be held liable for injuries suffered if the instrument is not returned for its annual safety check and maintained properly.

User Modifications

Unauthorized user modifications will void your warranty. Associated Research will not be responsible for any injuries sustained due to unauthorized equipment modifications or use of parts not specified by Associated Research. Instruments returned to Associated Research with unsafe modifications will be returned to their original operating condition at your expense.

TEST STATION

Location

Select an area away from the main stream of activity which employees do not walk through in performing their normal duties. If this is not practical because of production line flow, then the area should be roped off and marked for **HIGH VOLTAGE TESTING**. No employees other than the test operators should be allowed inside.

If benches are placed back-to-back, be especially careful about the use of the bench opposite the test station. Signs should be posted: **"DANGER - HIGH VOLTAGE TEST IN PROGRESS - UNAUTHORIZED PERSONNEL KEEP AWAY."**

Power

Dielectric Voltage-Withstand Test Equipment must be connected to a good ground. Be certain that the power wiring to the test bench is properly polarized and that the proper low resistance bonding to ground is in place.

Power to the test station should be arranged so that it can be shut off by one prominently marked switch located at the entrance to the test area. In the event of an emergency, anyone can cut off the power before entering the test area to offer assistance.

Work Area
Perform the tests on a nonconducting table or workbench, if possible.

There should not be any metal in the work area between the operator and the location where products being tested will be positioned.

Position the tester so the operator does not have to reach over the product under test to activate or adjust the tester. If the product or component being tested is small, it may be possible to construct guards or an enclosure, made of a non-conducting material such as clear acrylic, such that the item being tested is within the guards or enclosure during the test, and fit them with switches so that the tester will not operate unless the guards are in place or the enclosure closed.

Keep the area clean and uncluttered. All test equipment and test leads not absolutely necessary for the test should be removed from the test bench and put away. It should be clear to both the operator and to any observers which product is being tested, and which ones are waiting to be tested or have already been tested.

Do not perform Hipot tests in a combustible atmosphere or in any area where combustible materials are present.

TEST OPERATOR

Qualifications
This instrument generates voltages and currents which can cause **harmful or fatal electric shock** and must only be operated by a skilled worker trained in its use.

The operator should understand the electrical fundamentals of voltage, current, and resistance.

Safety Procedures
Operators should be thoroughly trained to follow these and all other applicable safety rules and procedures before they begin a test. Defeating any safety system should be treated as a serious offense and should result in severe penalties, such as removal from the Hipot testing job. Allowing unauthorized personnel in the area during a test should also be dealt with as a serious offense.

Dress
Operators should not wear jewelry which could accidentally complete a circuit.

Medical Restrictions
This instrument should not be operated by personnel with heart ailments or devices such as pacemakers.

TEST PROCEDURES

!NEVER PERFORM A HIPOT TEST ON ENERGIZED CIRCUITRY OR EQUIPMENT!

If the instrument has an external safety ground connection be sure that this is connected. Then Connect the return lead **first** for any test regardless of whether the item under test is a sample of insulating material tested with electrodes, a component tested with the high voltage test lead, or a cord-connected device with a two or three prong plug.

Plug in the high voltage test lead only when it is being used. Handle its clip only by the insulator---**never touch the clip directly.** Be certain that the operator has control over any remote test switches connected to the Hipot. Double check the return and high voltage connections to be certain that they are proper and secure.

On Models 6550DT and 6554SA the return side of the instrument is not grounded (earthed). This allows for the monitoring of very low leakage levels of current. It is therefore important that the **device under test is never grounded (earthed)** or the current meter will essentially be bypassed and you will get incorrect current meter readings.

WARNING

NEVER TOUCH THE ITEM UNDER TEST OR ANYTHING CONNECTED TO IT WHILE HIGH VOLTAGE IS PRESENT DURING THE HIPOT TEST.

When testing with DC, always discharge the capacitance of the item under test and anything the high voltage may have contacted--such as test fixtures--before handling it or disconnecting the test leads.

HOT STICK probes can be used to discharge any capacitance in the item under test as a further safety precaution. A hot stick is a nonconducting rod about two feet long with a metal probe at the end which is connected to a wire. To discharge the device under test, two hot sticks are required. First connect both probe wires to a good earth ground. Then touch one probe tip to the same place the return lead was connected. While holding the first probe in place, touch the second probe tip to the same place where the high voltage lead was connected. Again, check the meter to be sure the voltage has dropped to zero.

KEY SAFETY POINTS TO REMEMBER:

- Keep unqualified and unauthorized personnel away from the test area.
- Arrange the test station in a safe and orderly manner.
- Never touch the product or connections during a test.
- In case of any problem, turn off the high voltage first.
- Properly discharge any item tested with DC before touching connections.

GLOSSARY OF TERMS

(as used in this manual)

Alternating Current, AC: Current which reverses direction on a regular basis, commonly in the U.S.A. 60 times per second, in other countries 50 times per second.

Breakdown: The failure of insulation to effectively prevent the flow of current, sometimes evident by arcing. If voltage is gradually raised, breakdown will begin suddenly at a certain voltage level. Current flow is not directly proportional to voltage. Once breakdown current has flown, especially for a period of time, a repeated application of voltage will often show breakdown beginning at a lower voltage than initially.

Conductive: Having a volume resistivity of no more than 10^3 ohm-cm or a surface resistivity of no more than 10^5 ohms per square.

Conductor: A solid or liquid material which has the ability to let current pass through it, and which has a volume resistivity of no more than 10^3 ohm-cm.

Current: The movement of electrons through a conductor. Current is measured in amperes, milliamperes, microamperes, nanoamperes, or picoamperes. Symbol = **I**

Dielectric: An insulating material which is positioned between two conductive materials in such a way that a charge or voltage may appear across the two conductive materials.

Direct Current, DC: Current which flows in one direction only. The source of direct current is said to be polarized and has one terminal which is always at a higher potential than the other.

Hipot Tester: Common term for dielectric-withstand test equipment.

Hypot®: Registered trademark of Associated Research, Inc., for its dielectric-withstand test equipment.

Insulation: Gas, liquid or solid material which has a volume resistivity of at least 10^{12} ohm-cm and is used for the purpose of resisting current flow between conductors.

Insulation Resistance Tester: An instrument or a function of an instrument capable of measuring resistance's in excess of 200 megohms. Usually employs a higher voltage power supply than used in ohmmeters measuring up to 200 megohms.

Leakage: AC or DC current flow through insulation and over its surfaces, and AC current flow through a capacitance. Current flow is directly proportional to voltage. The insulation and/or capacitance is thought of as a constant impedance, unless breakdown occurs.

Resistance: That property of a substance which impedes current and results in the dissipation of power in the form of heat. The practical unit of resistance is the *ohm*. Symbol = **R**

Trip Point: The minimum current flow required to cause an indication of unacceptable performance during a dielectric voltage-withstand test.

Voltage: Electrical pressure, the force which causes current through an electrical conductor. Symbol = **V**

INTRODUCTION

The importance of testing... User safety
In an era of soaring liability costs, original manufacturers of electrical and electronic products must make sure every item is as safe as possible. All products must be designed and built to prevent electric shock, even when users abuse the equipment or by-pass built in safety features.

To meet recognized safety standards, one common test is the "dielectric voltage-withstand test". Safety agencies which require compliance safety testing at both the initial product design stage and for routine production line testing include: Underwriters Laboratories, Inc. (UL), the Canadian Standards Association (CSA), the International Electrotechnical Commission (IEC), the British Standards Institution (BSI), the Association of German Electrical Engineers (VDE), the Japanese Standards Association (JSI). These same agencies may also require that an insulation resistance test and high current ground bond test be performed.

The Dielectric Withstand (Hipot) Test....
The principle behind a dielectric voltage - withstand test is simple. If a product will function when exposed to extremely adverse conditions, it can be assumed that the product will function in normal operating circumstances.

The most common applications of the dielectric-withstand test are:

- Design (performance) Testing.... determining design adequacy to meet service conditions.
- Production Line Testing.... detecting defects in material or workmanship during processing.
- Acceptance Testing.... proving minimum insulation requirements of purchased parts.
- Repair Service Testing.... determine reliability and safety of equipment repairs.

The specific technique varies with each product, but basically, during a dielectric voltage - withstand test, an electrical devise is exposed to a voltage significantly higher than it normally encounters. The high voltage is continued for a given period of time.

If, during the time the component is tested, stray current flow remains within specified limits, the device is assumed to be safe under normal conditions. The basic product design and use of the insulating material will protect the user against electrical shock.

The equipment used for this test, a dielectric-withstand tester, is often called a "hipot" (for high potential tester). The "rule of thumb" for testing is to subject the product to twice its normal operating voltage, plus 1,000 volts.

However, specific products may be tested at much higher voltages than 2X operating voltages + 1,000 volts. For example, a product designed to operate in the range between 100 to 240 volts, can be tested between 1,000 to 4,000 volts or higher. Most "double insulated" products are tested at voltages much higher than the "rule of thumb".

Testing during development and prototype stages is more stringent than production run tests because the basic design of the product is being evaluated. Design tests usually are performed on only a few samples of the product. Production tests are performed on each and every item as it comes off the production line.

The hipot tester must also maintain an output voltage between 100% and 120% of specification. The output voltage of the hipot must have a sinusoidal waveform with a frequency between 40 to 70 Hz and has a peak waveform value that is not less than 1.3 and not more than 1.5 times the root-mean-square value.

Advantages and Disadvantages of AC Testing and DC Testing....

Please check with the Compliance Agency you are working with to see which of the two type of voltages you are authorized to use. In some cases a Compliance Agency will allow either AC or DC testing to be done. However in other cases the Compliance Agency only allows for an AC test. If you are unsure which specification you must comply with please contact our **CUSTOMER SUPPORT GROUP at 1-800-858-TEST (8378).**

Many safety agency specifications allow either AC or DC voltages to be used during the hipot test. When this is the case the manufacturer must make the decision on which type of voltage to utilize. In order to do this it is important to understand the advantages and the disadvantages of both AC and DC testing.

AC testing characteristics

Most items that are hipot tested have some amount of distributed capacitance. An AC voltage cannot charge this capacitance so it continually reads the reactive current that flows when AC is applied to a capacitive load.

AC testing advantages

1. AC testing is generally much more accepted by safety agencies than DC testing. The main reason for this is that most items being hipot tested will operate at AC voltages and AC hipot testing offers the advantage of stressing the insulation alternately in both polarities which more closely simulates stresses the product will see in real use.

2. Since AC testing cannot charge a capacitive load the current reading remains consistent from initial application of the voltage to the end of the test. Therefore, there is no need to gradually bring up the voltage since there is no stabilization required to monitor the current reading. This means that unless the product is

sensitive to a sudden application of voltage the operator can immediately apply full voltage and read current without any wait time.

3. Another advantage of AC testing is that since AC voltage cannot charge a load there is no need to discharge the item under test after the test.

AC testing disadvantages

1. A key disadvantage of AC testing surfaces when testing capacitive products. Again, since AC cannot charge the item under test, reactive current is constantly flowing. In many cases the reactive component of the current can be much greater than the real component due to actual leakage. This can make it very difficult to detect products that have excessively high leakage current.

2. Another disadvantage of AC testing is that the hipot has to have the capability of supplying reactive and leakage current continuously. This may require a current output that is actually much higher than is really required to monitor leakage current and in most cases is usually much higher than would be needed with DC testing. This can present increased safety risks as operators are exposed to higher currents.

DC testing characteristics

During DC hipot testing the item under test is charged. The same test item capacitance that causes reactive current in AC testing results in initial charging current which exponentially drops to zero in DC testing.

DC testing advantages

1. Once the item under test is fully charged the only current flowing is true leakage current. This allows a DC hipot tester to clearly display only the true leakage of the product under test.

2. The other advantage to DC testing is that since the charging current only needs to be applied momentarily the output power requirements of the DC hipot tester can typically be much less than what would be required in an AC tester to test the same product.

DC testing disadvantages

1. Unless the item being tested has virtually no capacitance it is necessary to raise the voltage gradually from zero to the full test voltage. The more capacitive the item the more slowly the voltage must be raised. This is important since most DC hipots have failure shut off circuitry which will indicate failure almost immediately if the total current reaches the leakage threshold during the initial charging of the product under test.

2. Since a DC hipot does charge the item under test it becomes necessary to discharge the item after the test.

3. DC testing unlike AC testing only charges the insulation in one polarity. This becomes a concern when testing products that will actually be used at AC voltages. This is a key reason that some safety agencies do not accept DC testing as an alternative to AC.

4. When performing AC hipot tests the product under test is actually tested with peak voltages that the hipot meter does not display. This is not the case with DC testing since a sinewave is not generated when testing with direct current. In order to compensate for this most safety agencies require that the equivalent DC test be performed at higher voltages than the AC test. The multiplying factor is somewhat inconsistent between agencies which can cause confusion concerning exactly what equivalent DC test voltage is appropriate.

The Insulation Resistance Test....
Some "dielectric analyzers today come with a built in insulation resistance tester. Typically the IR function provides test voltages from 500 to 1,000 volts DC and resistance from the kilohms to the gigaohms. This function allows manufacturers to comply with special compliance regulations. BABT and VDE are two agencies that may under certain conditions require an IR test on the product before a Hipot test is performed. This typically is not a production line test but a performance design test.

The insulation resistance test is very similar to the hipot test. Instead of the go/no go indication that you get with a hipot test the IR test gives you an insulation value usually in Megohms. Typically the higher the insulation resistance value the better the condition of the insulation. The connections to perform the IR test are the same as the hipot test. The measured value represents the equivalent resistance of all the insulation which exists between the two points and any component resistance which might also be connected between the two points.

Although the IR test can be a predictor of insulation condition it does not replace the need to perform a dielectric withstand test.

TYPES OF FAILURES DETECTABLE ONLY WITH A HIPOT TEST

- Weak Insulating Materials
- Pinholes in Insulation
- Inadequate Spacing of Components
- Pinched Insulation

IF YOU SHOULD HAVE ANY QUESTIONS RELATING TO THE OPERATION OF YOUR INSTRUMENT CALL 1-800-858-TEST(8378) IN THE U.S.A.

Model 6550DT Functional Specifications

DIELECTRIC WITHSTAND TEST MODE

INPUT	115 VAC (±15%), 47-63 Hz, Single Phase 230 VAC (±15%), 47-63 Hz, Single Phase User Selectable
FUSE	115 VAC - 5 Amp, 230 VAC - 3 Amp
OUTPUT RATING	5kV @ 20 mAAC & 10 mADC
OUTPUT ADJUSTMENT	0 - 5kV (AC & DC), 10 volt/step
HIGH TRIP RANGE	0.01 - 20.00 mAAC & 0.01 - 10.00 mADC 0.01mA/step. Accuracy ± (2% of setting + 0.02 mA)
LOW TRIP RANGE	0.00 - 19.99 mAAC & 0.00 - 9.99 mADC 0.01mA/step. Accuracy ± (2% of setting + 0.02mA)
FAILURE DETECTOR	Audible & Visual (LED & displayed on LCD) Meter holds breakdown voltage and leakage current reading after failure.
VOLTAGE DISPLAY	3 Digits, 5.00kV Full Scale, LCD Display Accuracy -Reading ± (2% of reading + 1 count) Setting ± (2% of setting + 5 volts)
CURRENT DISPLAY	4 Digits, 20.00mA Full Scale, LCD Display Accuracy - Reading ± (2% of reading +2 counts)
DC OUTPUT RIPPLE	≤ 5% ripple in RMS, (5kVDC, 10mA)
AC OUTPUT WAVE FORM	Sine wave, Distortion ≤ 1%
AC OUTPUT FREQUENCY	50 or 60Hz, ± 100 PPM, User Selectable
OUTPUT REGULATION	1% of setting from no load to full load
DWELL TIMER	1 - 999 seconds in 1 second increments or continuous. Accuracy ± 0.1 seconds
RAMP TIMER	0 - 99 seconds in 1 second increments. Accuracy ± 0.1 seconds

Model 6550DT Functional Specifications Cont'd

INSULATION RESISTANCE TEST MODE

OUTPUT VOLTAGE RANGE	100 - 1000 Volts, 1 volt/step
VOLTAGE METERING	3½ Digits, 0.00 - 1.00kV, 2 ranges Accuracy - ± (2% of reading + 1 count)
RESISTANCE METERING	4 Digits, 9999MΩ Full Scale Accuracy: 0 - 999 MΩ 100 - 499V ± (8% of reading + 1 MΩ) 500 - 1000V ± (3% of reading +.3 MΩ) 1000 - 9999MΩ 500 - 1000V ± 15% of reading
LIMIT RANGES	HI-Limit range = 0 - 9999MΩ LO-Limit range = 0 - 9999MΩ
DWELL TIMER	1 - 999 seconds in 1 second increments Accuracy ± 0.1 seconds

Model 6550DT Functional Specifications Cont'd

GENERAL SPECIFICATIONS

INTERFACE CAPABILITY	1. GPIB (IEEE 488) Control of all parameters (AC & DC test voltages, HI & LO trip current, 50/60 Hz mode, Arc On-Off, Dwell Timer, Ramp time, HI & LO Resistance trip, Storage & Recall of memorized setups, Test & Reset) 2. Basic Remote control: Inputs - Test, Reset, Memory Functions Outputs -Pass, Fail, Remote Alarm, test-in-Process 3. Special port for connection to optional scanning system to test up to 8 items or 8 individual points.
MEMORY	Allows storage of up to 20 different test programs.
SECURITY	Password lockout capability to avoid unauthorized access to test set-up program.
LINE CORD	Detachable 7 ft. (2.13m) power cable terminated in a three prong grounding plug.
TERMINATION'S	5 ft.(1.52m) high voltage and return leads with clips.
MECHANICAL	Bench or rack mount with tilt up front feet Dimensions (w x h x d) 17 x 8.75 x 12.5in (432 x 222 x 317mm) Weight 33 lbs (14.96kg) net
ENVIRONMENTAL	Operating Temperature -32° - 113°F (0° - 45°C) Relative Humidity - 0 to 95%
CALIBRATION	Traceable to National Institute of Standards and Technology (NIST). Calibration controlled by software. Adjustments are made through front panel keypad in a restricted access calibration mode. Calibration info. stored in non-volatile memory.

KEY FEATURES & BENEFITS OF MODEL 6550DT

1. A complete 3 in 1 system that includes an AC hipot, DC hipot, Insulation Resistance Tester, and IEEE interface in a single rack mount style cabinet.
   This allows the user to maximize use of their rack mount system since they can perform all these tests and only dedicate the space that this one instrument would require.

2. Full IEEE programmability comes as a standard feature in the 6550DT.
   All functions of the instrument can be programmed over the IEEE bus which makes the instrument adaptable to an automated system which can control the instrument and retrieve all test results.

3. Up to 20mA of current available in the AC hipot mode and 10 mA in the DC hipot mode.
   This makes this instrument a true hipot tester with enough output current to test even highly capacitive loads.

4. All parameters for the setups can be adjusted through a simple menu driven program by using a front panel keypad .
   This provides the operator with an easy and safe way to set trip currents and output voltages since all parameters are set without the high voltage activated. The easy to follow menu makes sure that the operator properly sets up each test mode.

5. Front panel LCD displays test parameters and results.
   The easy to view front panel LCD displays large characters and allows the operator to monitor the test. The display also holds the results after a test item failure so the operator can easily check the reason for a product failure.

6. Electronic ramp and dwell settings.
   This electronic ramp control helps keep test results consistent as well as reduce damage to sensitive products by providing a method to gradually bring up the test voltage and eliminate any high voltage spikes. The dwell timer also has a count down feature so the operator can clearly see how much time is left on the test.

7. Hi and Low limits on both the hipot and insulation test modes.
   This capability makes it possible to ensure that a test item was properly connected since the 6550DT can be set to look for minimum and maximum levels of current and resistance during the hipot and insulation resistance tests.

8. Line and load regulation.
   This system maintains the setting of the output voltage to within 1% even if the load or the line voltage vary to ensure that test results remain consistent and within safety agency requirements..

9. Built in basic remote control.
   This makes the 6550DT versatile enough to allow for remote control operation of the test even when it is not used in the IEEE interface mode.

10. Storage of up to 20 different test programs.
    A real benefit for manufacturers that test different products. This makes it possible to store all the various test parameters required and quickly recall them for each of the different products that needs to be tested. Each program can store all the parameters of either the hipot or the insulation resistance test so you can quickly switch between different types of tests. Program memories can also be accessed through the remote control port so that a manufacturer can quickly toggle through the various programs without even going into the set up menu.

11. Security password system.
    This makes it possible to limit user access to the setup screens so that only authorized personnel with a security password can change test parameters. This ensures that the required test parameters can not be tampered with.

12. Optional scanning system available for use with the model 6550DT.
    The optional scanning system can cycle through up to eight test items or test up to 8 points on a single DUT to help manufacturers increase throughput in the final test area.

13. Software calibration control.
    The 6550DT is calibrated through the front panel keypad. All calibration information is stored in non-volatile memory. This allows the 6550DT to be completely calibrated without removing any covers and exposing the technician to hazardous voltages.

14. User activated arc detection system.
    Many tests require the monitoring of arcing levels even if they do not exceed the maximum trip current level. The 6550DT allows the operator to select whether low level arcs should be detected which makes this instrument flexible enough to test any product.

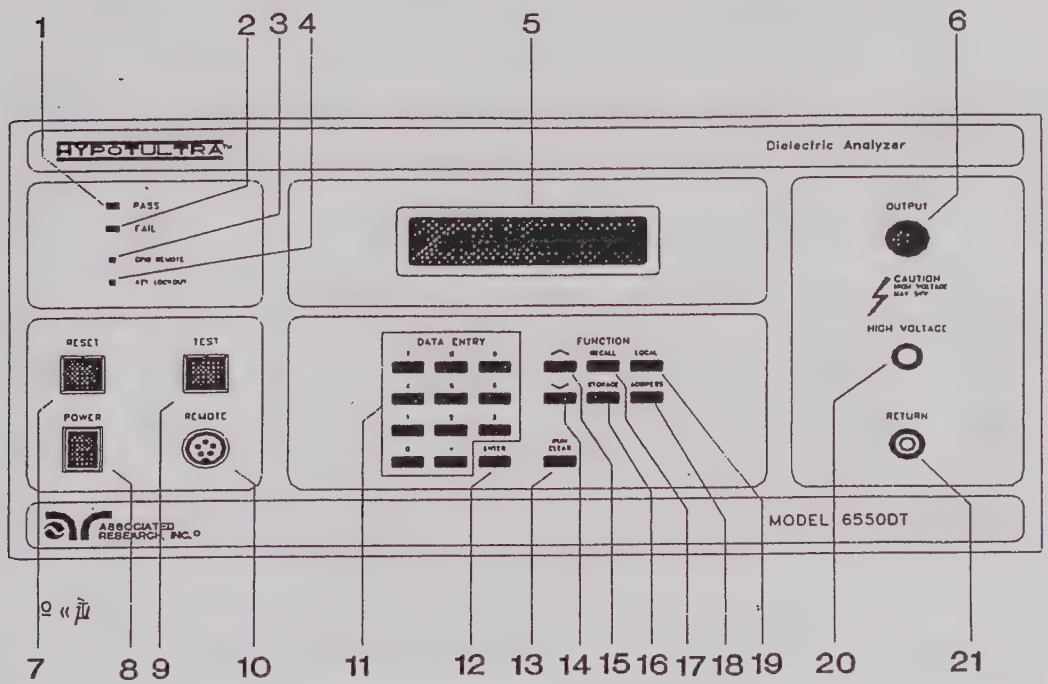
15. User Selectable output voltage frequencies of 50 or 60 hertz.
    The 6550DT was designed for the global market. This feature makes it simple for the user to select the output frequency on the AC hipot test so that products can be tested at the same frequency they will be used at.

16. The LCD display allows monitoring of current down to 10 microamps.
    Many tests only allow a very low level of acceptable leakage current. The 6550DT has the reading resolution to monitor and set trip points at these low levels.

17. Output voltage fine adjustment.
To make the 6550DT usable in all types of applications, a feature was added to allow the operator to manually bring the voltage up or down in 10 volt increments by simply pressing the up and down arrow keys. This makes it very easy to adjust the output voltage even while the 6550DT is in the dwell mode so you can analyze test results at different voltages.

18. Heavy duty color coded switches.
The 6550DT uses the same rugged switches that AR has used on other models of hipots for over 10 years which have proven to withstand even the roughest manufacturing environment. The switches are also color coded so that the operator can quickly distinguish between the TEST and RESET switch at a glance.

FRONT PANEL CONTROLS



1. **PASS LED INDICATOR:** This indicator lights at the end of a hipot or insulation resistance test if no failure has occurred during the test.

2. **FAIL LED INDICATOR:** When a failure occurs during a hipot test or insulation test this indicator will light and the LCD meter will display the type of failure present such as High Current Failure, Low Current Failure, and Arc Failure.

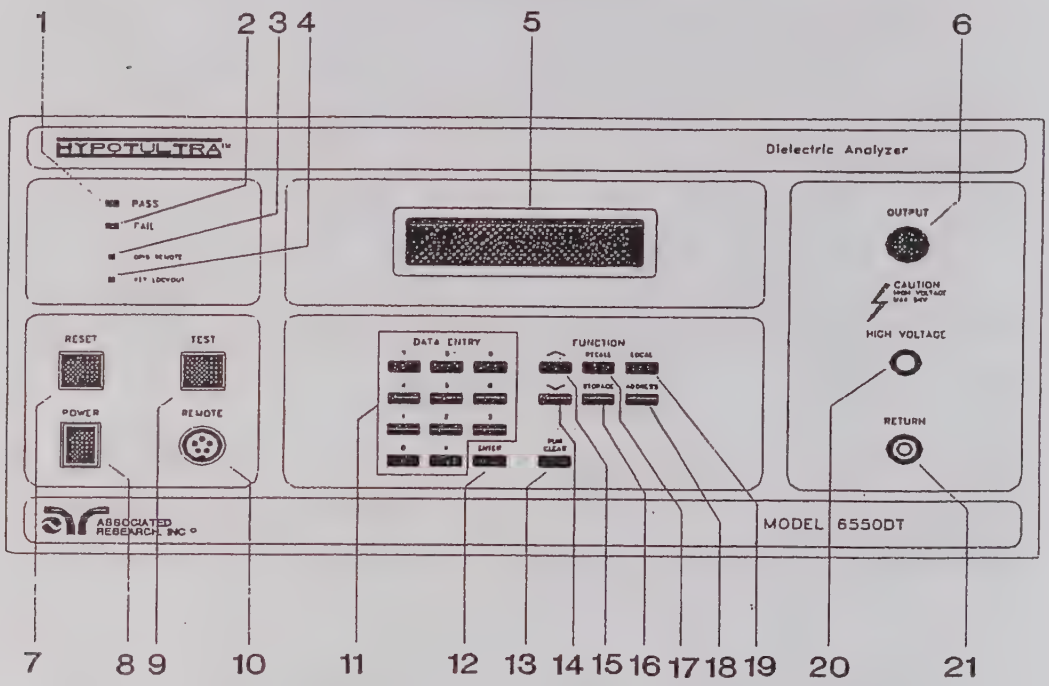
3. **GPIB REMOTE LED:** This indicator will light when the 6550DT is in the "Remote" connection vs. the "local" connection. When the GPIB Remote is on the 6550DT is able to send and receive signals across the GPIB IEEE-488 bus.

4. **KEY LOCKOUT LED:** When the Key Lockout light is on the "password" software lockout has been enabled. This means that the users will be unable to access the "program" mode of the instrument to change any settings.

5. **LCD DISPLAY:** The Liquid Crystal Display is the main readout for the operator and programmer of the test settings and test results. For **Voltage,** the display is 3 digits, 5.00 KV full scale. Reading accuracy is ±2% of reading +.1 count. Setting accuracy is ± 2% of setting + 5 volts. For **Current,** the display is 4 digits, 20.00 mA full scale. Reading accuracy is ± 2% of reading + 0.02 mA.

6. **HIGH VOLTAGE ON LED INDICATOR:** This indicator lights to warn the operator that high voltage is present at the high voltage output terminal.

FRONT PANEL CONTROLS



7. **RESET SWITCH:** This is a momentary contact switch. If out-of-range leakage current, or an arc breakdown is detected during the hipot test or a Hi-limit or LO-Limit insulation test failure occurs, the red Failure lamp (2) will light. To reset the system for the next test, press and release the red Reset switch.

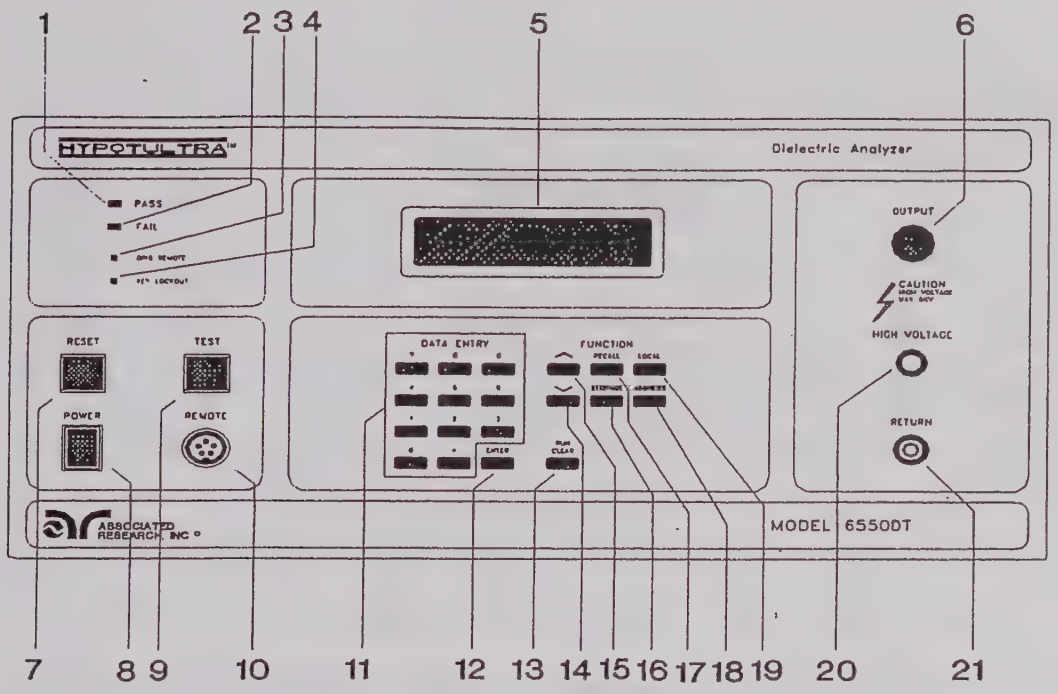
8. **POWER SWITCH:** Rocker-style switch with international ON (|) and OFF (0) markings.

9. **TEST SWITCH:** This is a momentary contact switch. Press the blue switch to turn on the high voltage output.

10. **REMOTE CONNECTOR:** The remote interface provides a convenient way to connect the instrument to a remote system for limited remote control capability. See page 36 for a complete description of the remote interface connector signals and guidelines for connection to a test system.

11. **DATA ENTRY NUMERIC KEYPAD:** For numeric entry or change of testing parameters during the "setup" mode. Keypad entry is unavailable if the "Key Lockout" indicator on the front panel is on.

FRONT PANEL CONTROLS



12. **KEYPAD-ENTER:** Use the enter button after entering new data through the keypad to save it and to advance the program to its next routine. Enter will also **toggle** between certain selections. See selections grid on page 30.

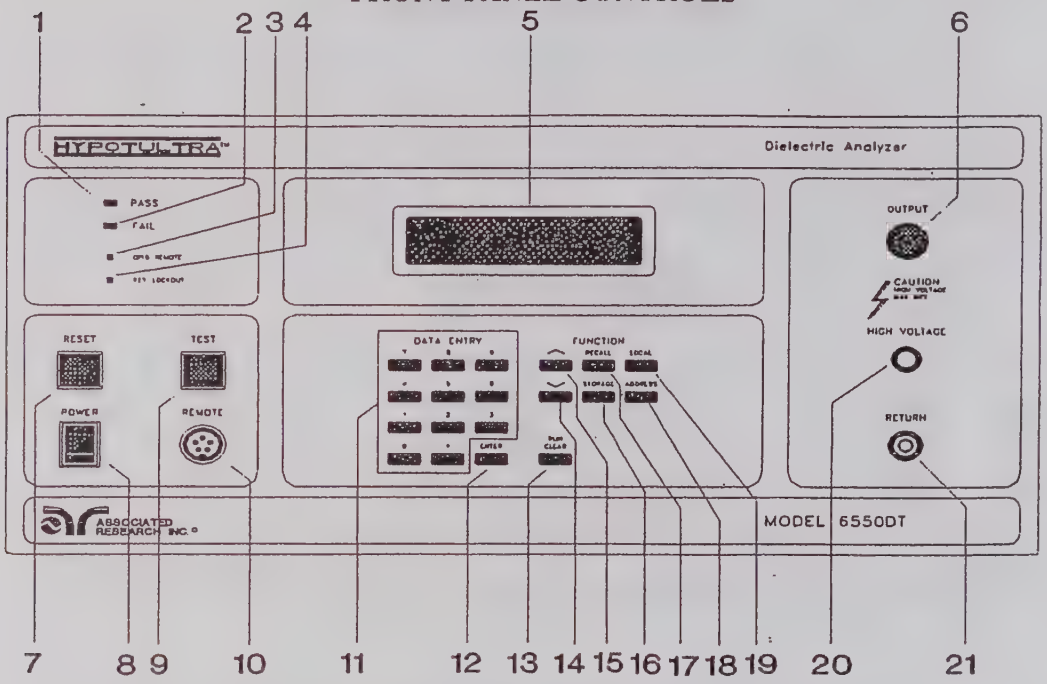
13. **RUN/CLEAR (FUNCTION KEY):** Use this key when you desire to enter the **Run Mode** to initiate a test or use this key when you enter numeric data during a **setup** routine and you wish to clear the information.

14. **DOWN ARROW ↓**: (FUNCTION KEY) Use this key to advance through the setup screens. Advances forward.

15. **UP ARROW ↑:** (FUNCTION KEY) Use this key to advance through the setup screens. Advances backward.

16. **STORAGE: (**FUNCTION KEY) Depress this key when in the memory function to store a test program setup. Adjust or enter test parameters then press "RUN|CLEAR" key then press "STORAGE" and select what number memory you wish to store your program in (1-20) and then press "ENTER" key.

FRONT PANEL CONTROLS



17. **RECALL:** (FUNCTION KEY) Depress this key when you wish to recall from memory a previously stored test setup. You then simply select the memory number you wish to recall and press "ENTER" key. The display will also show which memory is active. You can then use the ↓↑ arrows to review the test set up parameters. After adjusting a previously stored setup you must press "RUN/CLEAR" key then "STORAGE" key and enter a number from 1-20 which wish to save this setup under. Then press "ENTER" key. Your adjustments will then be saved. If you do not you will loose these changes when powering the instrument "OFF".

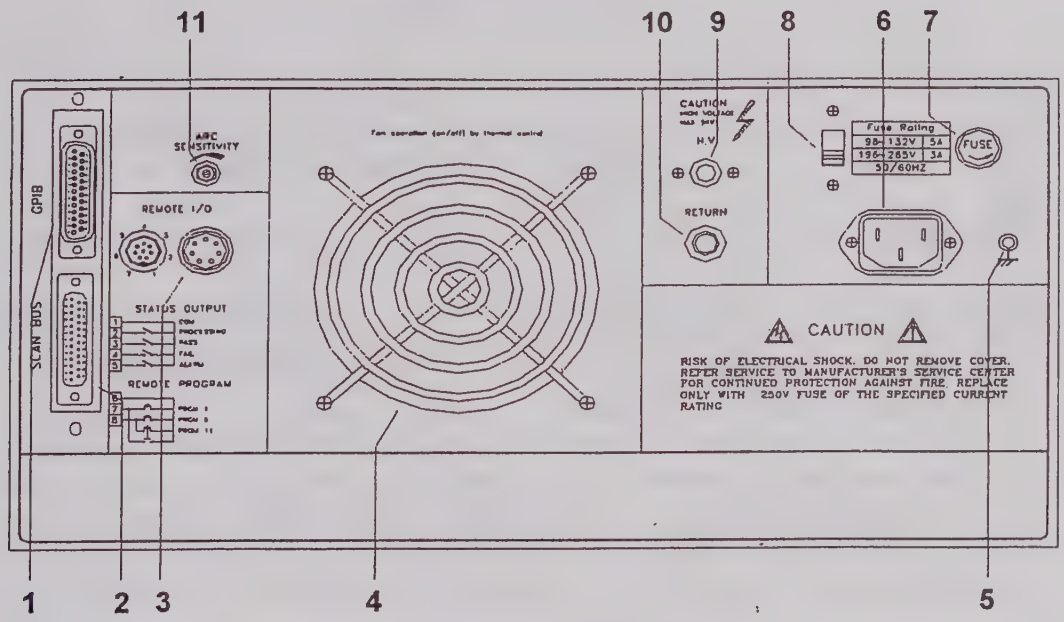
18. **ADDRESS:** (FUNCTION KEY) Use this key when you desire to change the address location for your GPIB (IEEE-488) remote control activities, or if you wish to set the instrument into lockout mode using a special code number see page 34.

19. **LOCAL:** (FUNCTION KEY) Use this key when you wish to go from the Remote operation of the instrument to the Local mode.

20. **HIGH VOLTAGE OUTPUT JACK:** For the connection of the detachable 5 foot (1.52 m) high voltage test lead. The silicone rubber insulation is flexible for easy handling and is rated at 30KVDC. The jack is recessed for safety when this lead is not being used.

21. **RETURN OUTPUT JACK:** For the connection of the detachable 5 foot (1.52 m) return test lead. This lead is always used when performing a test.

REAR PANEL CONTROLS



1). **IEEE-488 (GPIB) CONNECTOR:** See page 38 of operators manual.

2). **SCAN BUS CONNECTOR:** For connection of optional 8 channel Scanning Bus Matrix.

3). **REMOTE I/O:** See page 36 of operators manual.

4). **THERMAL FAN:** Cycles on to cool the instrument automatically.

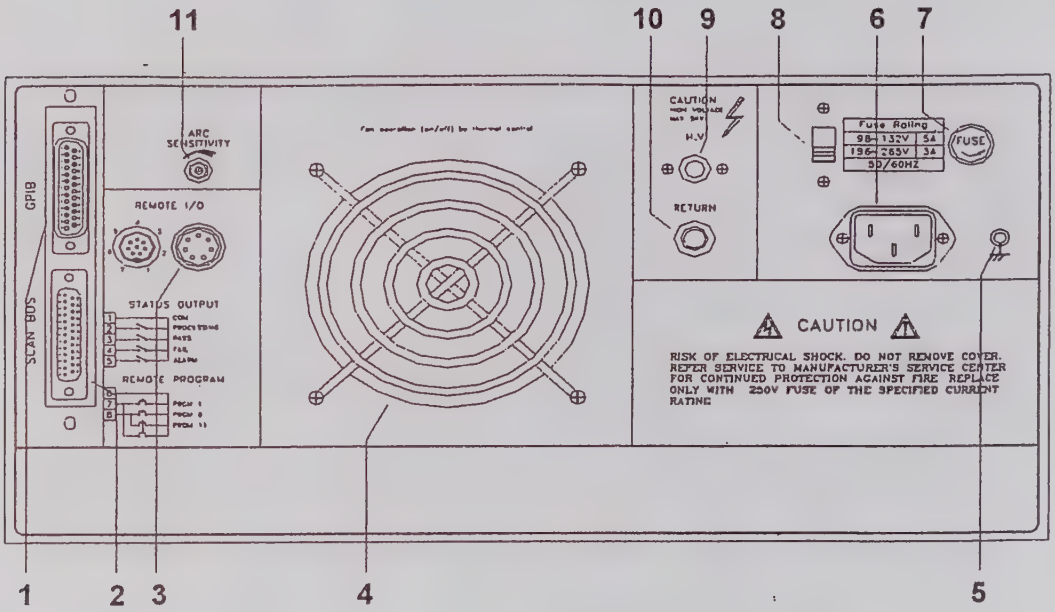
5). **CHASSIS GROUND (EARTH) TERMINAL:** This terminal should be connected to a good earth ground before operation.

6). **INPUT POWER RECEPTACLE:** Standard IEC 320 connector for connection to a standard NEMA style line power (mains) cord.

7). **FUSE RECEPTACLE:** To change the fuse unplug the power (mains) cord and turn the fuse cap counter clockwise to remove the fuse.

8). **INPUT POWER SWITCH:** Line voltage selection is set by the position of the switch. In the up position it is set for 110-120 volt operation, in the down position it is set for 220-240 volt operation.

REAR PANEL CONTROLS



9). **HIGH VOLTAGE OUTPUT JACK:** For the connection of the detachable 5 foot (1.52 m) high voltage test lead. The silicone rubber insulation is flexible for easy handling and is rated at 30KVDC. The jack is recessed for safety when this lead is not being used.

10. **RETURN OUTPUT JACK:** For the connection of the detachable 5 foot (1.52 m) return test lead. This lead is always used when performing a test.

11). **ARC SENSITIVITY ADJUSTMENT:** When the arc detection in the setup menu is on, this adjustment will increase or decrease its sensitivity to an arcing condition. See operators manual page 34.

INSTALLATION

Introduction

This section contains information for the unpacking, inspection, preparation for use and storage of your Associated Research, Inc., product.

Unpacking and Inspection

Your instrument was shipped in a custom foam insulated container that complies with ASTM D4169-92a Assurance Level II Distribution Cycle 13 Performance Test Sequence.

If the shipping carton is damaged, inspect the contents for visible damage such as dents, scratches or broken meters. If the instrument is damaged, notify the carrier and the Associated Research customer support department immediately. Please save the shipping carton and packing material for the carriers inspection. Our customer support department will assist you in the repair or replacement of your instrument. Please do not return your product without first notifying us and receiving an RGA (return goods authorization) number.

Preparation for Use

Power Requirements and Line Voltage Selection

The HypotUltra model 6550DT requires a power source of either 115 volts AC ± 15%, 47-63 Hz single phase or 230 volts AC ±15%, 47-63 Hz single phase. Please check the rear panel to be sure the proper switch setting is selected for your line voltage requirements before turning your instrument on. In addition please be sure the correct fuse is selected and installed while the instrument is in the off position.

CAUTION Do not switch the line voltage selector switch located on the rear panel while the instrument is on or operating. This may cause internal damage and represents a safety risk to the operator.

NOTE

For operation at 115 Volts AC use a 5A slo-blo fuse.
For operation at 230 Volts AC use a 3A slo-blo fuse.

Power Cable

WARNING

BEFORE CONNECTING POWER TO THIS INSTRUMENT, THE PROTECTIVE GROUND (EARTH) TERMINALS OF THIS INSTRUMENT MUST BE CONNECTED TO THE PROTECTIVE CONDUCTOR OF THE LINE (MAINS) POWER CORD. THE MAIN PLUG SHALL ONLY BE INSERTED IN A SOCKET OUTLET (RECEPTACLE) PROVIDED WITH A PROTECTIVE GROUND (EARTH) CONTACT. THIS PROTECTIVE GROUND (EARTH) MUST NOT BE DEFEATED BY THE USE OF AN EXTENSION CORD (POWER CABLE) WITHOUT A PROTECTIVE CONDUCTOR (GROUNDING).

HypotUltra Model 6550DT is shipped with a three-wire power cable. When this cable is connected to an appropriate AC power source, this cable connects the chassis to earth ground. The type of power cable shipped with each instruments depends on the country of destination.

Operating Environment

The HypotUltra model 6550DT may be operated in temperatures from 32° - 113° F (0° - 45° C).
Relative humidity of 0 to 95%.
Altitude up to 15,000 feet (4,600 meters).

STORAGE AND SHIPMENT

Environment

The 6550DT may be stored or shipped in environments with the following limits:

Temperature..... -40° to +75°C
Altitude..... 7,620 meters (25,000 feet)

The instrument should also be protected against temperature extremes which may cause condensation within the instrument.

Packaging

Original Packaging: Please retain all original packaging materials that you originally received. If you are returning your instrument to us for servicing please repackage the instrument in its original container. Contact our customer support department (1-800-858-8378) for a RGA (return goods authorization) number. Please enclose the instrument with all options, accessories and test leads. Indicate the nature of the problem or type of service needed. Also, please mark the container "FRAGILE" to insure proper handling. Upon receipt your instrument will be issued an AR service number. Please refer to this number in all correspondence.

Other Packaging: If you do not have the original packaging materials please follow these guidelines:

1). Wrap the instrument in a bubble pack or similar foam. Enclose the same information as above.

2). Use a strong double-wall container that is made for shipping instrumentation. 350 lb. test material is adequate.

3). Use a layer of shock-absorbing material 70 to 100 mm (3 to 4 inch) thick around all sides of the instrument. Protect the control panel with cardboard.

4). Seal the container securely.

5). Mark the container "FRAGILE" to insure proper handling.

6). Please refer in all correspondence to your AR service number.

Field Installation Of Options

There are no field installable options on the model 6550DT.

QUICK START

This quick start guide assumes the operator has some familiarity with automated hipot testing and desires to use the **"default"** settings on the instrument. The default settings shown will remain in memory unless you choose to override them with your own test program. The instrument default settings are as follows:

DEFAULTS

- **Input Voltage:** 115 volts AC (rear panel switch selectable)
- **Communications:** local (front panel key selectable)
- **Mode:** set-up
- **Voltage Output:** 1,240 volts AC
- **Current Trip:**
  W-UPPER: 10 mA
  W-LOWER: 0.00 mA
- **Dwell Timer:** 1 second
- **Ramp Time:** 1 second
- **Voltage Type:** AC
- **AC Output Frequency:** 60Hz
- **Arc detection sensitivity:** on
- **W-Scan** all off (00000000)
- **Connect** off
- **Insulation Resistance Test:** R=off (when withstand test is on within Memory 1)

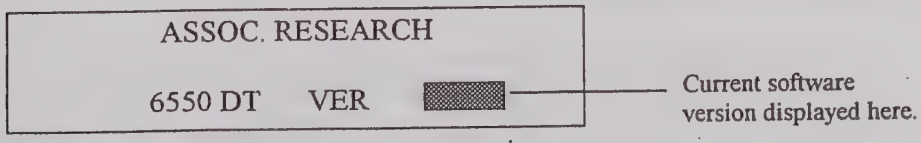
a). Unpack the HypotUltra Model 6550DT from its special shipping container. Be sure to save all packaging materials in case you need to return it to the factory for service.

WARNING b). Locate a suitable testing area and be sure you have read all safety instructions for the operation of the instrument and suggestions on the test area set-up in SECTION I. Locate a three prong grounded outlet. Be sure the outlet has been tested for proper wiring before connecting the Model 6550DT to it.

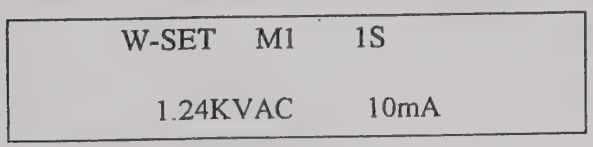
CAUTION c). Check to be sure the correct input line voltage has been selected on the rear panel. Either 115 volts AC or 230 volts AC. Connect the power input plug into its socket on the rear panel of the instrument. Connect the male end of the plug to the outlet receptacle.

Please be sure that the safety ground on the power line cord is not defeated and that you are connecting to a grounded power source.

d). Turn on the POWER switch located on the lower left hand side of the front panel. Upon powering the instrument up a POWER ON SELF TEST (POST) will be automatically be performed. This test will check for the condition of the ram chips, led indicators, pcb's and other critical components. All of the front panel led's will light temporarily then go out. In addition you will see the Associated Research name and Model Number briefly appear on the LCD readout and then clear itself.



You should then see the default parameters on the LCD meter as follows:



These abbreviated parameters stand for the following:

W-SET: - The withstand (hipot) test is set to ON.
M 1: The instrument is using the default set ups contained in memory 1.
1 S: The dwell timer is set to a test duration of 1 second.
1.24KVAC: The test voltage is set to 1,240 volts AC.
10.00 mA: The high leakage current trip point is set to 10 milliamps.

If you wish to not use any one of these parameters you must overwrite the memory 1 position or change your parameters and save them in a different memory such as memory position 2. For detailed instructions on setting up testing parameters and saving them to memory see page 30.

e). If the instrument defaults are acceptable then be sure to connect the appropriate test leads to the device under test (DUT) or test fixture. Be sure to connect this safety ground to a suitable known good ground before energizing this instrument, Then connect the return lead first (black) to the test fixture or item followed by the high voltage output lead (red).

WARNING f). Please check your connections to be sure they are making good contact and that the test station or area is clear of debris and other personnel. DO NOT TOUCH THE DEVICE UNDER TEST ONCE THE TEST HAS BEEN STARTED. To initiate the test press the BLUE test button on the front panel. This is a momentary button and does not need to be held in the pressed position during the test. The instrument will then cycle ON and begin the automated test sequence using the defaults. If a failure occurs you will HEAR an audible alarm go off. To stop the alarm you must depress the RED button marked RESET. This will silence the alarm and reset the instrument to begin another test.

This RESET button may also be used as a safety button to quickly ABORT a test and cut off the HIGH VOLTAGE. When HIGH VOLTAGE is present a RED indicator located in the upper right side of the front panel will glow and remain ON until the HIGH VOLTAGE is OFF. If the device under test PASSED the test then no audible alarm will sound. You will hear a brief BEEP to let you know the item was successfully tested and it PASSED. In the case of a FAIL condition the instrument will provide a memory of the test condition results on the LCD display that will remain until the next test is initiated. Depressing the reset button will reset the instrument alarm while keeping the last test results on the display. Depressing the reset button a second time will clear the display.

OPERATION

MAIN MENU SELECTIONS

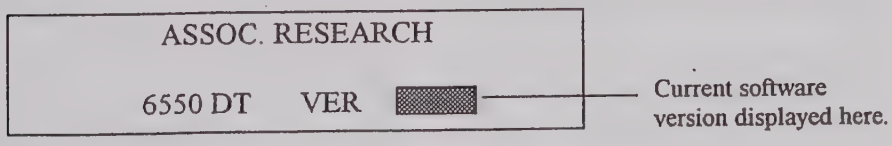
When you need to access the program set-up mode you must be sure that the "lockout" LED on the front panel is not lit. If it is lit you must first take the instrument out of "lockout" before beginning to change or enter new test set-up information. To exit or enter "lockout" mode see the instructions for the "lockout" on page 34.

The keys that are used when navigating around in the setup mode are ↑ up arrow moves you forward by one selection or ↓ down arrow moves you backward by one selection. The **W** prefix on the LCD display refers to **WITHSTAND** tests and the **R** prefix refers to **INSULATION** tests. An over-range condition will be displayed on any "numeric" selection as an **"ERROR"**. The instrument will then revert back to the previously saved value.

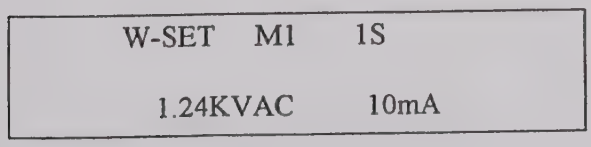
To change the defaults in memory 1 or to enter new setups into memory please do the following:

1). Turn on the instrument and wait for the power on self test to complete.

2). You should then briefly see the opening display as below.



3). You will then see the defaults of **"memory 1"** on the LCD as shown below.



4). Press the ↓ down arrow key to begin sequencing through the selections. The selections available are as follows;

DISPLAY NAME	OPTIONS AVAILABLE	ACTIONS REQUIRED
W/R	WITHSTAND or INSULATION TEST SELECTION	ENTER ↵ TOGGLES ↓ADVANCES
W-VOLT	TEST VOLTAGE OUTPUT NUMERIC ENTRY 0-5,000 VOLTS	ENTER ↵ AND ↓ ADVANCES
W-UPPER	UPPER LEAKAGE FAIL TRIP POINT NUMERIC ENTRY 0-20.00 mA	ENTER ↵ AND ↓ ADVANCES
W-LOWER	LOWER LEAKAGE FAIL TRIP POINT NUMERIC ENTRY 0-19.99 mA	ENTER ↵ AND ↓ ADVANCES
W-TIMER	TIME TO HOLD TEST VOLTAGE NUMERIC ENTRY 1-999 SECONDS	ENTER ↵ AND ↓ ADVANCES
W-RAMP	TIME TO RAMP TEST VOLTAGE NUMERIC ENTRY 0-99 SECONDS	ENTER ↵ AND ↓ ADVANCES
W-AC\DC	SELECTS AC or DC VOLTAGE	ENTER ↵ TOGGLES ↓ ADVANCES
W-50\60	SELECTS OUTPUT FREQUENCY OF 50 or 60 Hz	ENTER ↵ TOGGLES ↓ ADVANCES
W-ARC	TURNS ARC DETECTION ON or OFF	ENTER ↵ TOGGLES ↓ ADVANCES
W-SCAN	TO USE OPTIONAL SCANNER , SET UP TO 8 OUTPUTS (1 = HIGH, 0= LOW, . = OFF)	ENTER ↵ TOGGLES ↓ADVANCES
CONNECT	TO CONNECT MEMORIES 1-20 IN SEQUENCE FOR MULTIPLE TESTS	ENTER ↵ TOGGLES ↓ ADVANCES

5). If all you wish to do is to change from a WITHSTAND test to a RESISTANCE test than you do not have to scroll through the entire set of selections. Upon instrument power up you use the "down arrow" ↓ and press it once. You will then see the selection for **W/R**. The "enter key" ↵ will toggle between W (withstand) and R (Resistance). Upon selecting the R (Resistance) test you will be presented with a new list of options and LCD meter displays as follows;

DISPLAY NAME	OPTIONS AVAILABLE	ACTIONS REQUIRED
W/R	WITHSTAND or INSULATION RESISTANCE TEST SELECTION	ENTER ↵ TOGGLES ↓ADVANCES
R-VOLT	TEST VOLTAGE OUTPUT NUMERIC ENTRY 100-1,000 VOLTS	ENTER ↵ **AND** ↓ **ADVANCES**
R-UPPER	UPPER MEGOHM FAIL TRIP POINT NUMERIC ENTRY 0-2000 MΩ	ENTER ↵ **AND** ↓ **ADVANCES**
R-LOWER	LOWER MEGOHM FAIL TRIP POINT NUMERIC ENTRY 0-1999 MΩ	ENTER ↵ **AND** ↓ **ADVANCES**
R-TIMER	TIME TO HOLD TEST VOLTAGE NUMERIC ENTRY 1-999 SECONDS	ENTER ↵ **AND** ↓ **ADVANCES**
R-SCAN	TO USE OPTIONAL SCANNER, SET UP TO 8 OUTPUTS (1 = HIGH, 0 = LOW, . = OFF)	ENTER ↵ **AND** ↓ **ADVANCES**
CONNECT	TO CONNECT MEMORIES 1-20 IN SEQUENCE FOR MULTIPLE TESTS	ENTER ↵ TOGGLES ↓ADVANCES

TYPICAL TEST LCD DISPLAYS:

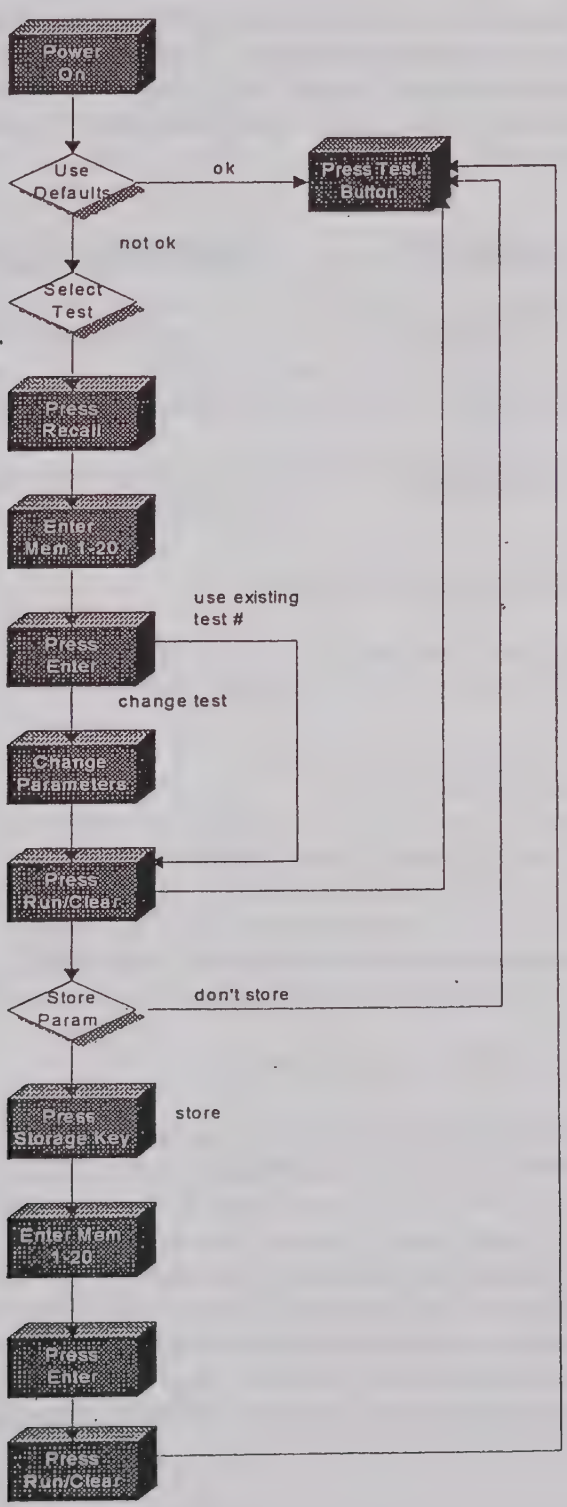
W-SET M1 1S 1.24KVAC 10.00mA	Withstand Voltage Test

R-TEST M2 2S 0.50KVDC 0MΩ	Insulation Resistance Test

TYPICAL PASS\FAIL PANEL DISPLAYS:

W-PASS M1 1S 1.24KVAC 0.00mA	Withstand pass indication. Pass led will light and remain on until next test is performed.
W-UPPER M1 0S 0.00KVAC OFL mA	Withstand failure indication with arc detection set to "off". Upper limit failure. Failure led will remain on until new test is started.
W-ARC M1 1S 0.17KVAC OFL mA	Arc detection failure on withstand test. Readings will remain on meter until the next test.
W-LOWER M1 0S 1.24KVAC 0.00 mA	Lower limit failure on Withstand Test.
R-UPPER M1 2S 1.00KVDC OFL MΩ	Upper limit failure on Insulation Resistance Test. Failure light will remain on until next test. Reset will stop the failure buzzer.
R-LOWER M1 2S 1.00KVDC 0.00MΩ	Lower limit failure on Insulation Resistance Test.
R-PASS M1 2S 1.00KVDC 0.00MΩ	Insulation Resistance Test Pass Indication.

Flow Chart of HypotULTRA Menu Selections



SETUP MODE LOCKOUT CODE

The Model 6550DT is supplied with a lockout code feature that is intended to prevent an unauthorized user from entering the **set-up mode.** The lockout is active when the front panel LED (# 4) is lit. To enter the "lockout mode" press the "address" front panel key # 18, then press the numeric keypad number 9 four times then the 'enter" key # 12. This will turn on the keylock and also turn it off.

KEYS	ACTION REQUIRED
ADDRESS	Press **ADDRESS** key
9	Press numeric key **9** four times, (9999)
ENTER↵	Press **ENTER↵** key

CALIBRATION MODE LOCKOUT CODE

To enter the calibration mode you must hold down the 0 and the 1 on the numeric keypad at the same time while you power up the instrument. The screen will then display the following;

Calibration Mode
2=KV 3=mA 4,5=MΩ

You are then in the calibration mode. See the SERVICE section of this manual for detailed calibration information.

ARC SENSITIVITY ADJUSTMENT

The arc sensitivity control is located on the rear panel control # 11. The software allows you to turn the arc detection circuit on/off by toggling the "enter" key. You can, when the arc detector is set to "ON" also adjust its sensitivity. With the arc detector set to OFF you will be able to draw arcing conditions as long as the current you draw is lower than the HIGH TRIP LEAKAGE setting in your setups. Example: Set the HIGH TRIP LEAKAGE to the maximum of the instrument, 20mA. You will then be able to (with the addition of a resistor value in series with the high voltage test lead) create an arcing condition without the instrument going into failure. You should determine the acceptable leakage values of your devices and then set the arc sensitivity to the proper threshold for a failure condition.

CONNECT PROGRAM

This instrument has the capability of linking memorized setups together so that they can automatically be performed in sequence. While configuring each setup the operator can elect to turn CONNECT "on" in the setup they are currently programming to have the instrument proceed after successful completion of the first test program and automatically run the next setup program. If CONNECT is left "off" the instrument will only run the current setup program once the test is initiated.

Once the operator has linked all the setups they wish to perform as a single test they must RECALL the first setup of the sequence in order to begin the sequence that has been setup. The instrument will automatically stop when it reaches the last setup that has CONNECT turned "off". If the operator initiates the test again the instrument will once again begin the program from the first setup that the test was originally initiated from.

Several multiple setup programs can be stored into the instrument. As an example the operator could configure the setups as follows:

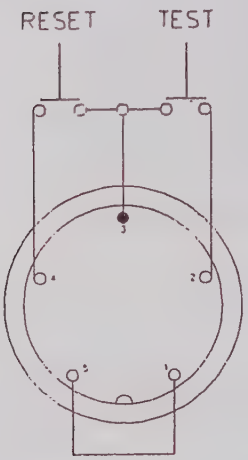
setup #1 CONNECT "on"
setup #2 CONNECT "on"
setup #3 CONNECT "off"
setup #4 CONNECT "on"
setup #5 CONNECT "on"
setup #6 CONNECT "off"

If the test is started while in setup #1 the instrument would proceed up to setup #3 before stopping if all tests passed. If started while in memory #4 the instrument would proceed to setup #6 before stopping if all tests passed. In the event that any test would fail the instrument will indicate failure and stop the test sequence. If the reset button is pushed to clear the failure and the test is again initiated the instrument will begin testing from the first test setup in the sequence once again

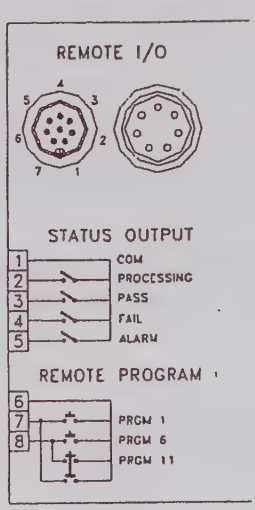
REMOTE INTERFACE CONFIGURATIONS

REMOTE INTERFACES FRONT & REAR PANEL:

Front Panel Remote Interface



Rear Panel Remote Interface



FRONT PANEL REMOTE INTERFACE

The 6550DT front panel remote connector (10) allows remote operation of the TEST and RESET functions. In order to activate the remote connector a jumper must first be wired across pins 1 and 5. The matching female connector to attach to the front panel connector is provided with the 6550DT. Any type of momentary switch can then be wired across pins 2 and 3 to allow remote operation of the TEST function. When the remote connector is activated the front panel TEST switch (9) is deactivated. A momentary switch can also be wired across pins 3 and 4 which allows remote operation of the RESET function. For safety the front panel RESET switch (7) remains active even when a remote reset switch is connected so that high voltage can be shut down from either location.

REAR PANEL REMOTE INTERFACE

The 6550DT can operate in a basic remote control function even when GPIB control is not utilized. The rear panel connector provides output signals to remotely monitor PASS, FAIL, PROCESSING and ALARM conditions. These signals are provided by four normally open internal relays that switch on to indicate the current condition of the tester. A common terminal is provided so that an external voltage can be applied to the remote

connector to operate external devices. The maximum contact rating of the internal relays are 220VAC at 3 amps. Below is a listing that indicates what conditions activate each pin. When a terminal becomes active the relay closes and connects that terminal to the common terminal thereby allowing the external voltage to operate an external device.

PIN ONE - COMMON
PIN TWO - PROCESSING
PIN THREE - PASS
PIN FOUR - FAIL
PIN FIVE - ALARM

The following describes how the relays operate for each test condition.

PROCESSING - The relay contact closes the connection between the common pin (1) and pin (2) while the instrument is performing a test. The connection is opened at the end of the test.

PASS - The relay contact momentarily closes the connection between the common pin (1) and pin (3) after detecting that the item under test passed all tests.

FAIL - The relay contact closes the connection between the common pin (1) and pin (4) after detecting that the item under test failed any test. The connection is opened when the next test is initiated.

ALARM - The relay contact closes the connection between the common pin (1) and pin (5) after detecting that the failure alarm has sounded. The connection is opened when the instrument is reset and the alarm is deactivated.

REMOTE INPUTS

The 6550DT also allows access to its setup programs through a remote control connection. This gives the user the capability to quickly change parameters remotely even when the GPIB mode is not utilized. The 6550DT basically operates in a PLC mode by responding to simple relay contact closures. The built in memory programs of the instrument are used to accomplish this. The internal memory programs are arranged into three groups. By connecting terminal 6,7 and 8 in different combinations the user can select which memorized test setups to activate.

The following describes how each program is activated and what memorized test setups are run.

PROGRAM ONE - Momentarily connecting terminal 6 to 7 signals the instrument to immediately begin the test program that is stored in memory one. If this memory is linked to the next memory it will also move on to perform the next test setup until it reaches a memory that is not linked or until it reaches memory five which is the last memory in this group.

PROGRAM TWO - Momentarily connecting terminal 6 to 8 signals the instrument to immediately begin the test program that is stored in memory six. If this memory is linked to the next memory it will also move on to perform the next test setup until it reaches a memory that is not linked or until it reaches memory ten which is the last memory in this group.

PROGRAM THREE - Momentarily connecting terminals 6, 7 and 8 together signals the instrument to immediately begin the test program that is stored in memory eleven. If this memory is linked to the next memory it will also move on to perform the next test setup until it reaches a memory that is not linked or until it reaches the last memory of the instrument.

REMOTE INTERFACE IEEE-488 (GPIB):

This section provides information on the proper use and configuration of the remote interface (GPIB) IEEE-488.

A Brief History of IEEE-488....

Hewlett-Packard designed in 1965 the Hewlett-Packard Interface Bus (HP-IB) to connect their line of programmable instruments to computers. This bus had high transfer rates (nominally 1 Mbytes/s), and thus quickly gained acceptance. Later, it was accepted as the IEEE Standard 488-1975 and has since evolved into ANSI/IEEE Standard 488.1-1987.

IEEE-488 has expanded over the years and is used with many more types of computers and instruments than just HP. Because of this it is usually referred to as the General Purpose Interface Bus, (GPIB).

GPIB Messages

There are typically two types of messages that GPIB devices use to communicate with other interconnected GPIB devices;

Interface messages: often called commands or command messages and Device dependent messages often called data or data messages.

Data Messages: contain information such as programming instructions or measurement results.
Command Messages perform functions such as initializing the bus and addressing and un-addressing devices.

Functions:

A GPIB device can be a Listener, Talker and/or Controller. A Talker sends data messages to one or more Listeners, which receive data. A Controller manages the information flow on the GPIB by sending commands to all devices. The GPIB bus is much like a computer bus except a computer has circuit cards connected via a backplane and the GPIB has stand alone devices connected via a cable.

Signals and Lines:

The GPIB consists of 16 signal lines and 8 ground-return or shield drain lines. The 16 signal lines are grouped into 8 data lines, 3 handshake lines and 5 interface management lines.

Data Lines: The eight data lines, DI01 through DI08 carry data and command messages. The 7-bit ASCII or ISO code set is used and the eighth bit DI08 is unused.

Handshake Lines: The transfer of message bytes between devices is done via three asynchronously control lines. Referred to as three-wire interlocked handshake. This guarantees that message bytes on the data lines are sent and received without transmission error.

NRFD (not ready for data) indicates when a device is ready or not ready to receive a message byte.

NDAC (not data accepted) indicates when a device has or has not accepted a message byte.

DAV (data valid) tells when the signals on the data lines are stable (valid) and can be accepted safely by devices.

Interface Management Lines: Five lines are used to manage the flow of information across the interface.

ATN (attention) ATN is driven true by the controller when it uses the data lines to send commands, and drivers ATN false when a Talker can send data messages.

IFC (interface clear) IFC is driven by the system controller to initialize the bus and become CIC.

REN (remote enable) The REN line is driven by the controller which is used to place devices in remote or local program mode.

SRQ (service request) The SRQ line can be driven by any device to asynchronously request service from the Controller.

EOI (end or identify) This line has two purposes- the Talker uses this line to mark the end of a message string, and the Controller uses it to tell devices to identify their response in a parallel poll.

GPIB Connector:

Connection is usually accomplished with a 24-conductor cable with a plug on one end and a connector at the other end. Devices may be connected in a linear, star or a combination configuration.

The standard connector is the Amphenol or Cinch Series 57 Microribbon or AMP CHAMP type. The GPIB uses negative logic with standard transistor-transistor login (TTL) levels. When DAV is true, for example, it is a TTL low level (≤ 0/8 V), and when DAV is false, it is a TTL high level (≥ 2.0 V).

Restrictions and Limitations on the GPIB

A maximum separation of 4 m between any two devices and an average separation of 2 m over the entire bus.

A maximum total cable length of 20 m.

No more than 15 device loads connected to each bus, with no less than two-thirds powered on.

Note: A bus extender which is available from numerous manufacturers is available to overcome these limitations.

Interface Functions:

The capability of a device connected to the bus is specified by its interface functions. These functions provide the means for a device to receive, process, and send messages over the bus. The interface functions of the Model 6550DT are listed in the chart below. All functions may be controlled over the bus except ARC sensitivity and input voltage which are Selectable on the rear panel see rear panel drawing on page 21.

GPIB INTERFACE FUNCTIONS

IEEE-488 INTERFACE	SH1: Complete source handshake capability. AH1: Complete acceptor handshake capability. T6: Talker function. L4: Listener function. SRO: No service request capability. RL1: Complete remote/local capability. PPO: No parallel poll capability. DCO: No device clear capability. DTO: No device trigger capability. CO: No controller capability. E2: 3 state driver.
CONTROLLABLE ITEMS	Test/Reset control. Setting of test status/parameters for test.
DATA CODES	ASCII
DELIMITER	CR + LF (+ EOI)

GPIB ADDRESS

Each device on the GPIB (IEEE-488) interface must have a unique address. You can set the 6550DT address to any value between 1 and 29. The address is set to " 8 " when the instrument is shipped from the factory. The 6550DT address is displayed when you depress the "Address: button on the front panel keypad #18.

The address can only be set from the front panel. The address is stored in non-volatile memory and does not change when the power has been off or after a remote interface reset.

REMOTE OPERATION WITH IEEE-488 (GPIB) INTERFACE

6550DT IEEE COMMAND LIST

TYPE	COMMAND	EXPLANATION
Binary Status	?0	Binary status. If the 6550DT talks after reception of the "?0" command, it will output four bytes which indicates the current programmed stats, the first two bytes are empty. The meaning of the last two bytes is: Byte 3: Status Bits Bit 7 = 1 an ERROR COMMAND occurred Bit 6 = 0 Bit 5 = 1 the INSULATION RESISTANCE test FAILED Bit 4 = 1 the WITHSTANDING VOLTAGE test FAILED Bit 3 = 0 Bit 2 = 1 ALL TESTS were PASSED Bit 1 = 1 an OVER LOAD failure occurred Bit 0 = 1 an ARC failure occurred Byte 4: Status Bits Bit 7 = 1 the WITHSTANDING VOLTAGE test is in DC mode Bit 6 = 1 the voltage of WITHSTANDING VOLTAGE TEST is RAMPING Bit 5 = 1 the INSULATION RESISTANCE test PASSED Bit 4 = 1 the WITHSTANDING VOLTAGE test PASSED Bit 3 = 0 Bit 2 = 1 the INSULATION RESISTANCE is PROCESSING Bit 1 = 1 the WITHSTANDING VOLTAGE is PROCESSING Bit 0 = 1

Feedback Value	?3	WITHSTANDING VOLTAGE TEST voltage. If the 6550DT talks after reception of the "?3" command, it will output four bytes which indicates the current measured value. (unit: KILOVOLTS)
	?4	WITHSTANDING VOLTAGE TEST current. If the 6550DT talks after reception of the "?4" command, it will output four bytes which indicates the current measured value. (unit: MILLIAMPS)
	?5	INSULATION RESISTANCE TEST voltage. If the 6550DT talks after reception of the "?5" command, it will output four bytes which indicates the current measured value. (unit: KILOVOLTS)
	?6	INSULATION RESISTANCE TEST value. If the 6550DT talks after reception of the "?6" command, it will output four bytes which indicates the current measured value. (unit: MEGOHMS)
	?7	TIMER counter. If the 6550DT talks after reception of the "?7" command, it will output four bytes which indicates the current counter value. (unit: Seconds)

Operation Function	F0	Start automatic test program (TEST)
	F1	Stop automatic test program (RESET)
Operation Status Function	F6	Set WITHSTANDING VOLTAGE test mode
	F7	Set INSULATION test mode
	F8	Set the output of WITHSTANDING VOLTAGE test in AC mode
	F9	Set the output of WITHSTANDING VOLTAGE test in DC mode
	FA	Set the output of WITHSTANDING VOLTAGE test to 60 Hz
	FB	Set the output of WITHSTANDING VOLTAGE test to 50 Hz
	FC	Enable the ARC Function
	FD	Disable the ARC Function
	FE	Enable CONNECT mode to run next program
	FF	Disable CONNECT mode to run single program only

Parameter Set Function	S4	Set voltage of WITHSTANDING VOLTAGE test (0-5000v, 10v/STEP)
	S5	Set upper limit of leakage current of WITHSTANDING VOLTAGE test current. (0.00 - 20.00mA, 0.01mA/STEP)
	S6	Set lower limit of leakage current of WITHSTANDING VOLTAGE test current (0.00-20.00mA, 0.01mA/STEP)
	S7	Set time of WITHSTANDING VOLTAGE test (0-999Sec., 1 Sec/STEP)
	S8	Set ramp time of WITHSTANDING VOLTAGE test (0-99 Sec 1 Sec/STEP)
	S9	Set voltage of INSULATION RESISTANCE test (100 - 1000v, 10v/STEP)
	SA	Set upper limit of RESISTANCE ON INSULATION test (0-2000 Megohms,1 Megohm/STEP)
	SB	Set lower limit of RESISTANCE ON INSULATION test limit (0-1999 Megohms, 1 Megohm/STEP)
	SC	Set judgment delay time of INSULATION RESISTANCE (0-999Sec, 1Sec/STEP)
Storage & Recall	SD	Store all status and parameters to memory bank (1-20)
	SE	Recall a memory from bank to controller (1-20)
Scanning unit Control	SG	Set test channel of scanning unit of WITHSTANDING VOLTAGE test (H= High, L= Low, O= Off)
	SH	Set test channel of scanning unit of INSULATION test (H= High, L= Low, O= Off)

EXAMPLE OF SETTING VOLTAGE OVER THE IEEE BUS

To write commands over the IEEE bus you must enter a code that is specific to the software you are using. Then follow the example below:

To set the output voltage across the IEEE bus at 1240 volts do the following; Type in the following string, **"S4 1240"** (ENTER↵): This tells the instrument you are setting the voltage at 1240 volts. A string is a list of ASCII characters, octal or hex bytes, or special symbols, enclosed in double quotes.

To set the ramp time of the Withstand Voltage test across the IEEE bus at 10 seconds do the following; Type in the following string, **"S8 10"** (ENTER↵): This tells the instrument you are setting the ramp time at 10 seconds.

To set outputs 1 & 2 of the scanner to High, outputs 3 & 4 to Low, and outputs 4-8 to Off type in the following string, **" SGHHLL0000"** .

FOR MORE INFORMATION ON IEEE (GPIB) PLEASE CONTACT:

The Institute of Electrical and Electronic Engineers, Inc.
345 East 47th Street,
New York, New York 10017

☎ 1-212-705-7018 (Communications Society of IEEE)

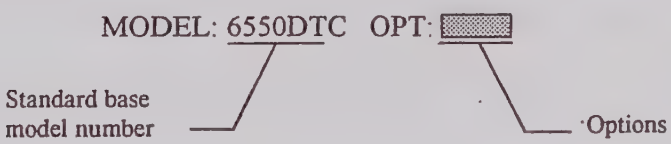
MODEL 6550DT OPTIONS

Introduction

This section contains a list and descriptions of available factory installed options at the time of this printing. The list of options contains an option code number which can be referenced on the data plate on the rear panel of the unit.

Data Plate

The option code is contained in the OPT field. The complete model number will include the standard base model number and end with the letter "C" when options are present.



For example your data plate would appear as follows:

standard model (no options)	MODEL: 6550DT
fitted with option 02	MODEL: 6550DTC OPT: 02
fitted with option 01 and 03	MODEL: 6550DTC OPT: 0103

6550DT Options

Option List

Code	Description
01	High Resolution Timer (.1 sec.)
02	GPIB Interlock (reset switch)
03	High Resolution Current Meter (1uA)

Description

01 High Resolution Timer

The High Resolution Timer settings option gives the user the capability to set the ramp and dwell time in .1 second increments with a limited range of .5 to 9.9 seconds for Ramp and .5 to 999.9 for Dwell. Accuracy is increased to ± .02 sec. All other functionality remains the same as the standard model. The standard range is 1-999 seconds in 1 second increments.

02 GPIB Interlock

The GPIB Interlock option gives the capability to wire a remote interlock (or reset) switch externally to mechanically interrupt the GPIB control. This option is available for remote fixturing safety lockouts. The standard model has no remote capability when GPIB mode has been selected.

The function is made accessible through the reconfigured Remote I/O, Remote Program inputs, pins 6 and 7. The Remote Program inputs have been disabled in both local and GPIB mode for this option.

A contact closure or other short circuit across Pin 6 and Pin 7 will lock out the GPIB control or hold the unit in reset while the pins are shorted. If a test is in process when the interlock is activated the test is aborted and output power will be interrupted immediately. When the contact is broken between pin 6 and 7 the GPIB resumes control.

For standard operation of the Remote Program Inputs see page 37 of this manual for details.

03 High Resolution Current Meter

The High Resolution Current Meter option allows the user to monitor the leakage current with higher reading resolution and accuracy in the Dielectric Withstand Test Mode. However to achieve this reading resolution the full scale range of the meter must be limited from the standard 20.00 mA to 4.000 mA. The modified relavant specifications are as follows.

OUTPUT RATING	5kV @ 4 mAAC & 4 mADC
CURRENT DISPLAY	4 Digits, 4.000 mA Full Scale, LCD Display Accuracy - Reading ± (2% of reading +3 counts)
HIGH TRIP RANGE	0.001 - 4.000 mAAC & 0.001 - 4.000 mADC 0.001mA/step. Accuracy ± (2% of setting + 0.003 mA)
LOW TRIP RANGE	0.000 - 3.999 mAAC & 0.000 - 3.999 mADC 0.001mA/step. Accuracy ± (2% of setting + 0.003mA)

For standard specifications on the Dielectric Withstand Test Mode see page 11 of this manual.

SECTION 2
SERVICE MANUAL

CALIBRATION PROCEDURES

This instrument has been fully calibrated at the factory in accordance to our published specifications. It has been calibrated to NIST. You will find in this manual a copy of the "Certificate of Calibration". It is recommended that you have this instrument recalibrated and a safety check done at least once per year. AR recommends you use "Calibration Standards" with an accuracy of ≤ 0.5% to keep this instrument within published specifications. Calibration adjustments can only be made in the Calibration mode, calibration checks can only be made in a Test mode of operation.

Calibration Equipment Required:

The following equipment will be needed to properly calibrate your instrument. Please be sure that you use instruments with at least an accuracy of **≤ 0.5%** .

1). Digital Multimeter with the minimum ranges;
ac voltage: 1,000 volts
ac & dc current: 20μA,200μA, and 20mA ranges.

2). 120KΩ/10Watt resistor

3). 10KΩ/¼ Watt resistor

4). 110MΩ/¼Watt resistor

TO ENTER CALIBRATION MODE:

In order to enter the calibration of this instrument you must depress the 0 and the 1 on the numeric keypad and at the same time you power up the instrument. The LCD display will show the following when you are in the calibration mode;

Calibration Mode
2=KV 3=mA 4,5=MΩ

There are essentially two main areas that are addressed in the calibration of the 6550DT;

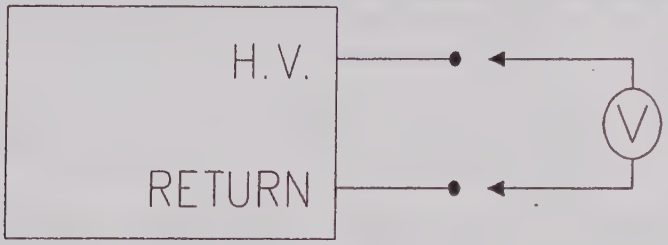
I). Calibration of the Withstand Voltage Measuring Circuit: high voltage and leakage current. All adjustments are made to the AC mode. The DC calibration is automatically adjusted through the processor by using the AC value.

II). Calibration of the Insulation Voltage Measuring Circuit: high range and low range.

I). Calibration of the Withstand Voltage measuring circuit:

a). High Voltage

Connect a standard AC voltmeter between terminal "H.V." and the "RETURN". Press the numeric keypad number 2. The instrument will then automatically provide aprox., 1000 volts across the voltmeter. Please be sure that the measuring range of the AC voltmeter is set to over 1050 volts and the polarity of "H.V." and "RETURN" is "+" and "-".



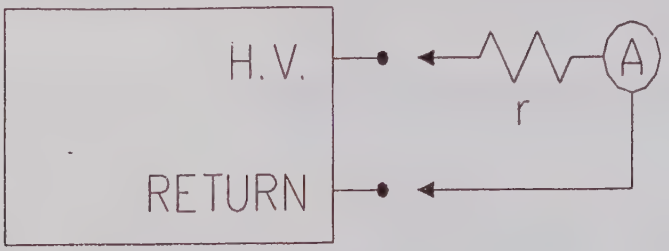
After proper connection to the AC voltmeter per the previous diagram the LCD display will show the following.

VOLTAGE = _____ V

Please enter the reading of the voltmeter into the instrument in units of 1 volt. For example: If the reading of the standard voltmeter is 985 volts, please key in 9 8 5 Enter ↵. The high voltage is then calibrated and you are returned to the main calibration screen.

b). Leakage Current

Connect a resistor with a value of about 120KΩ, 10 watts in series with a standard AC ammeter between the "H.V." terminals and the "RETURN". Press the numeric keypad number 3. The instrument will provide aprox., 1000 volts automatically across the resistor in series with the ammeter. See connection diagram next page:



After proper connection the LCD display will appear as below:

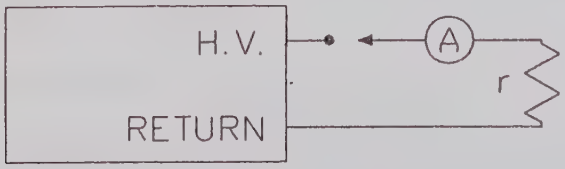
mA*100 = _____ mA

Current will then flow through the ammeter. Please enter the reading of the ammeter into the instrument in units of 0.01 mA. For example: If the reading of the ammeter is 8.27 mA, then you would enter 8 2 7 ENTER ↵. The leakage current is then calibrated and you will be returned to the main calibration menu.

II). Insulation Voltage Measuring Circuit

a). Low Resistance

Connect a 10KΩ standard resistor between the "H.V." terminal and "RETURN" and a DC Ammeter in series with the "H.V." output as shown below.



Press the numeric keypad number 4. This will enter you into the low resistance calibration mode. The LCD will display as in the following diagram:

μA*10 = _____ μA

Key in the reading on the DC Ammeter display using units of 0.1 μA. For example; If the reading is 98.7 μA then you would enter 9 8 7 ENTER↵. Then the low range of the resistance measuring circuit is calibrated and you are returned to the main calibration menu.

b). High Resistance Range

Connect a resistor with a value of about 110MΩ in series with a standard microammeter between the "H.V." and the "RETURN" terminals as in the diagram above. Press the numeric keypad 5. You will then be in the high resistance range calibration mode and the display will show as below:

μA*100 = _____ μA

Please enter the reading on the micoammeter into the instrument in units of 0.01 μA. For example: If the reading is 9.92 μA then enter 9 9 2 ENTER ↵. The high range of the insulation measuring circuit is calibrated.

- The **RUN/CLEAR** key may be used for clearing an error after entry and to exit from a specific calibration set up screen to the main calibration menu.
- The instrument must be turned off after calibration in order for the calibration to be stored into the EPROM, or to return to the testing or test set-up mode.

PARTS LIST: MODEL 6550DT HypotULTRA

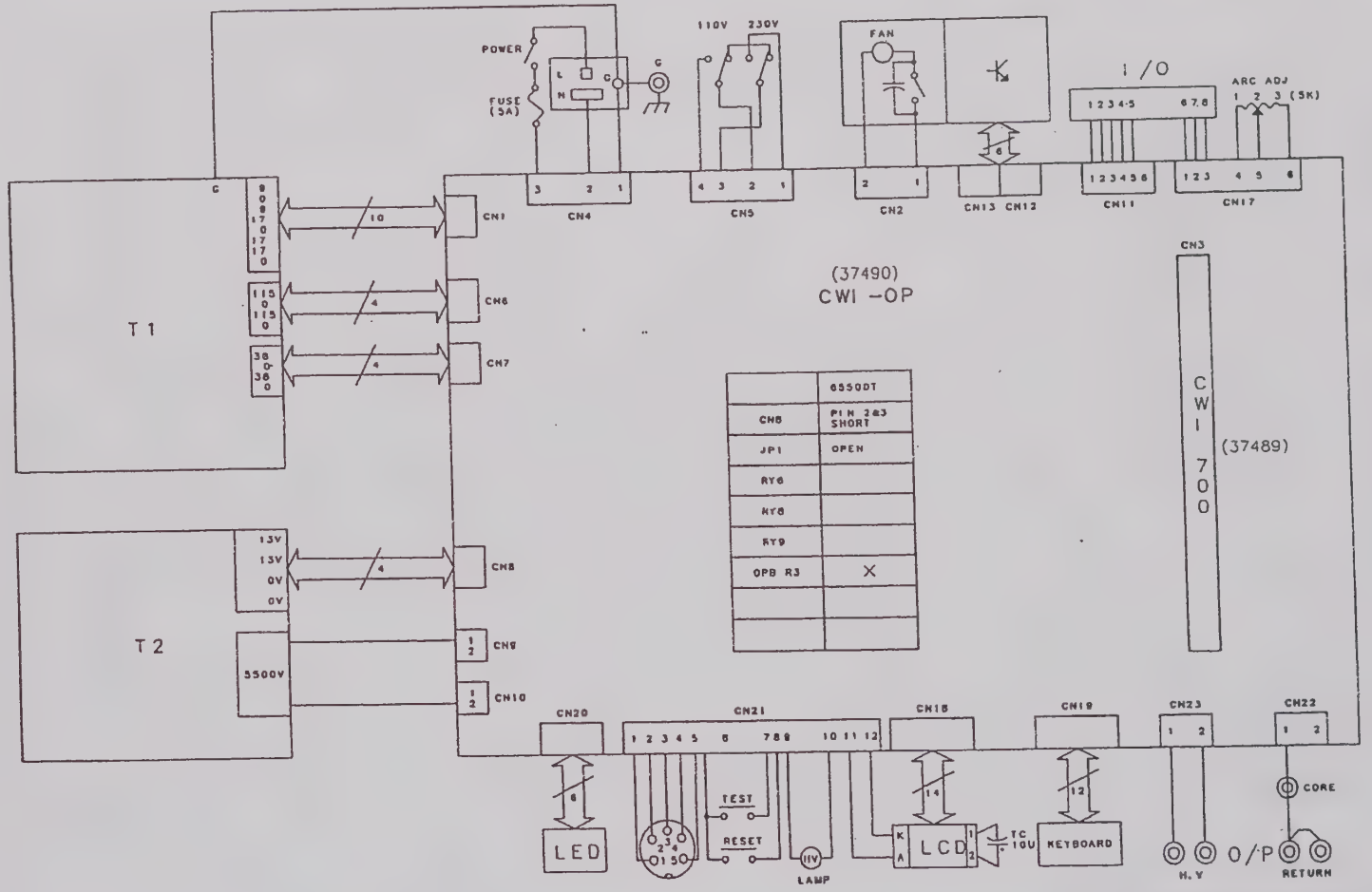
FOR SERVICE INFORMATION IN THE U.S.A. PLEASE CALL 1-800-858-8378
OUTSIDE U.S.A CALL 1-708-295-3312

When ordering replacement parts please provide us with the following information;

- Model Number
- Serial Number
- Item Number
- Quantity Required

ITEM NUMBER	DESCRIPTION	QTY
37485	MAIN AMPLIFIER ASSEMBLY, INCLUDES PCB-TR-200, AND TR-1148	1
37486	DRIVER BOARD	1
37487	POWER TRANSISTOR	4
37488	KEYBOARD ASSEMBLY	1
37489	MAIN CONTROL BOARD	1
37490	MOTHER BOARD	1
37491	FUSE 250V/5A 30MM, SLOW BLOW	1
37492	FUSE 250V/3A 30MM, SLOW BLOW	1
37493	FUSE HOLDER	1
37494	LCD MODULE	1
37495	LED ASSEMBLY	1
37496	HIGH VOLTAGE INDICATOR LIGHT	1
37497	RESET SWITCH	1
37498	POWER ON/OFF SWITCH	1
37499	SLIDE SWITCH	1
37500	TEST SWITCH	1
37501	MAIN TRANSFORMER	1
37502	HIGH VOLTAGE TRANSFORMER	1
37503	ARC SENSITIVITY POTENTIOMETER	1
37504	INPUT POWER RECEPTACLE	1
04040A-08	HIGH VOLTAGE OUTPUT CABLE	1
02100A-13	RETURN CABLE	1
33189	LINE CORD (MAINS)	1
05400DT-34	HIGH VOLTAGE OUTPUT JACK	2
35999	RETURN JACK	2

REVISIONS					
SYM	DESCRIPTION	ECO#	DATE	APPR	CHK



	6550DT
CN8	PIN 2&3 SHORT
JP1	OPEN
RY6	
RY8	
RY9	
OPB R3	X

FILE. S6550DT.DWG/S6550DT.GP4

ASSOCIATED RESEARCH, INC.

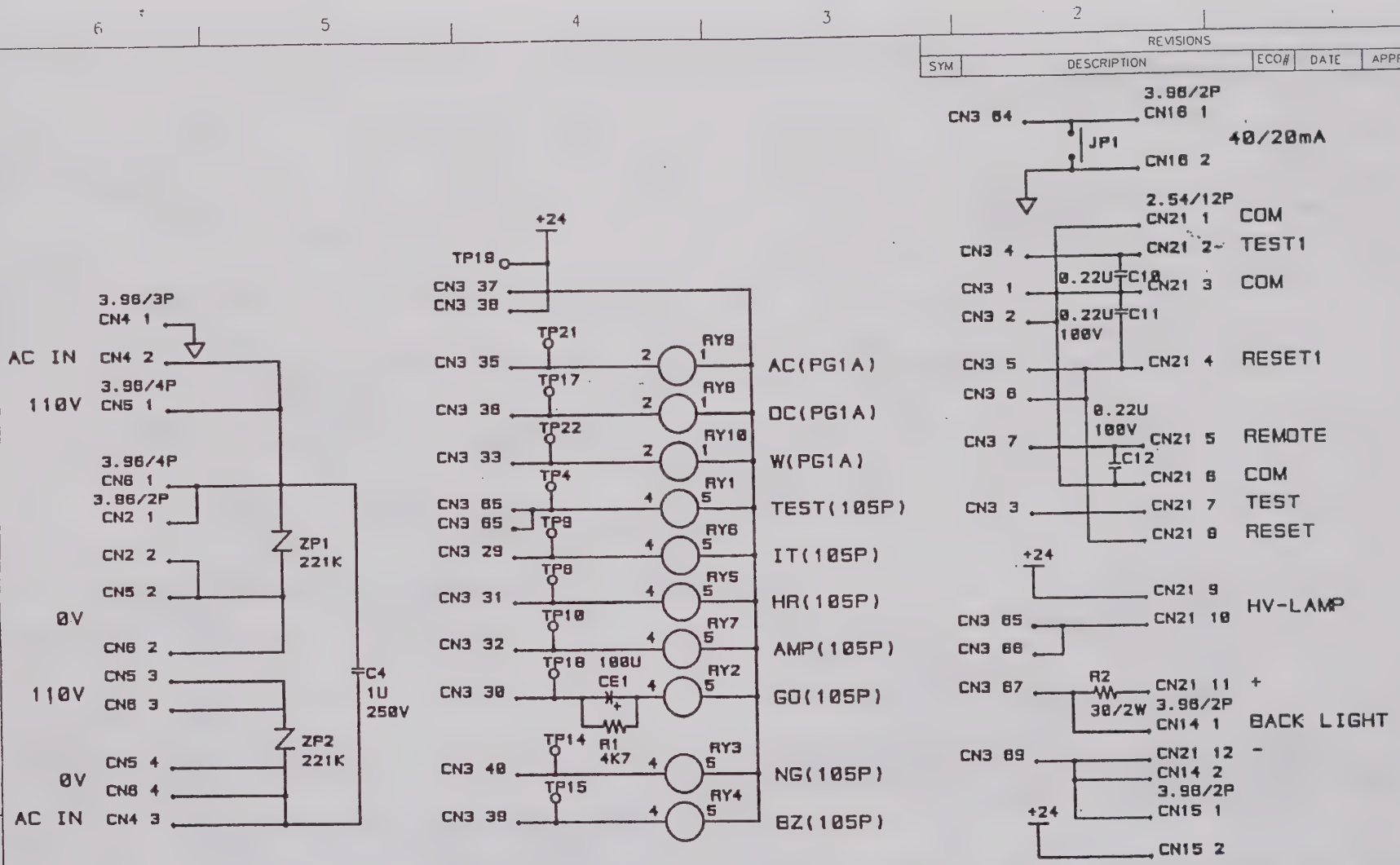
USED ON MODEL/ASSY
6550DT

SCHEMATIC
WIRING DIAGRAM
6550DT

			SIZE		REV
DRAWN	CPY	06.16.83	A	S06550DT	–
CHECKED	NCT	10.2.95			
APPROVED	RB	10.3.95	SCALE NONE	SHEET 1 OF 1	

SCHEMATIC INDEX

Drawing Number	Description	Pages
S06550DT	Wiring Diagram	1
S37490	PCB Mother Board	3
S37489	PCB Main Control	3
S37486	PCB Driver Board	1
S37488	PCB Keypad Assy	1
S37495	PCB LED Indicator	1



REVISIONS					
SYM	DESCRIPTION	ECO#	DATE	APPR	CHK

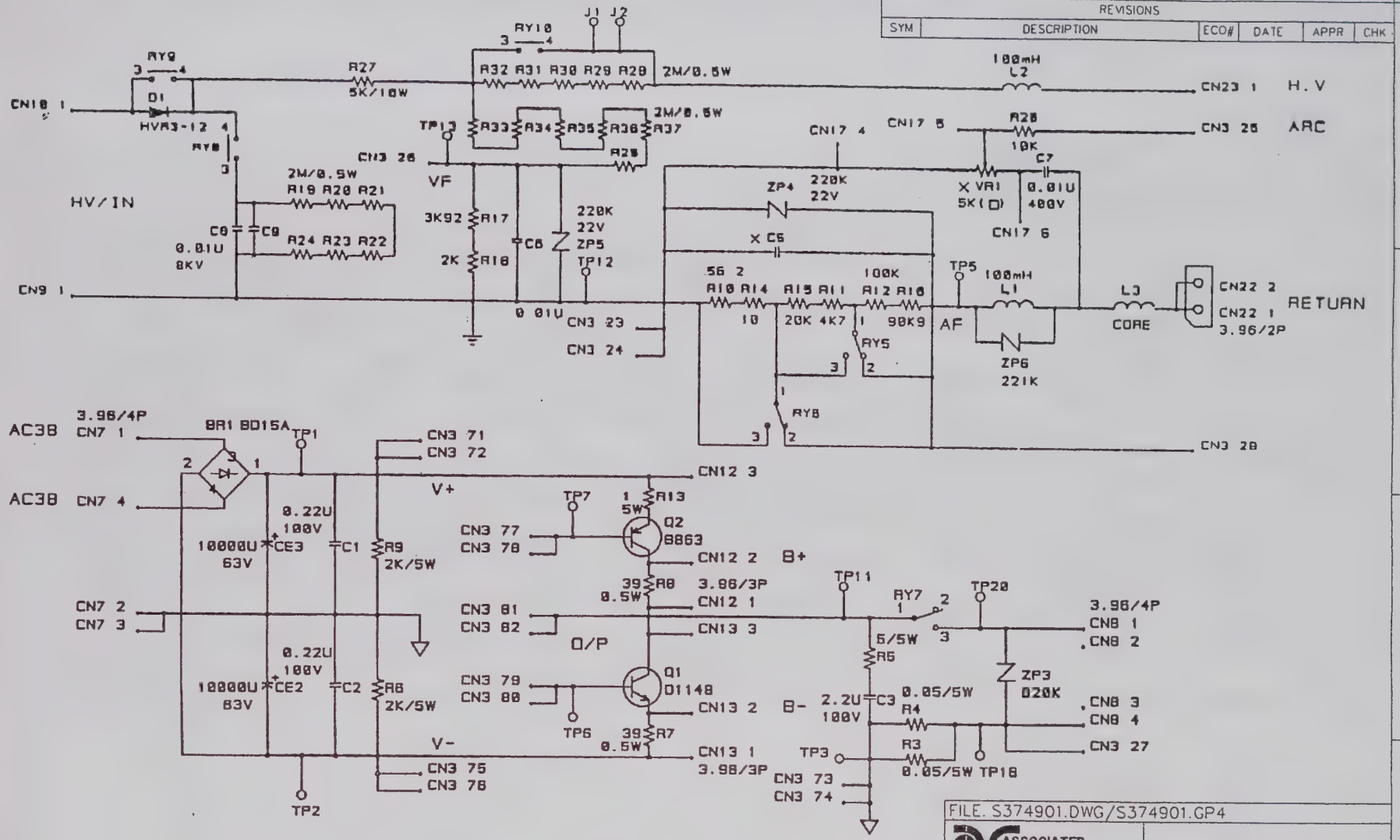
FILE: S374902.DWG/S374902.GP4

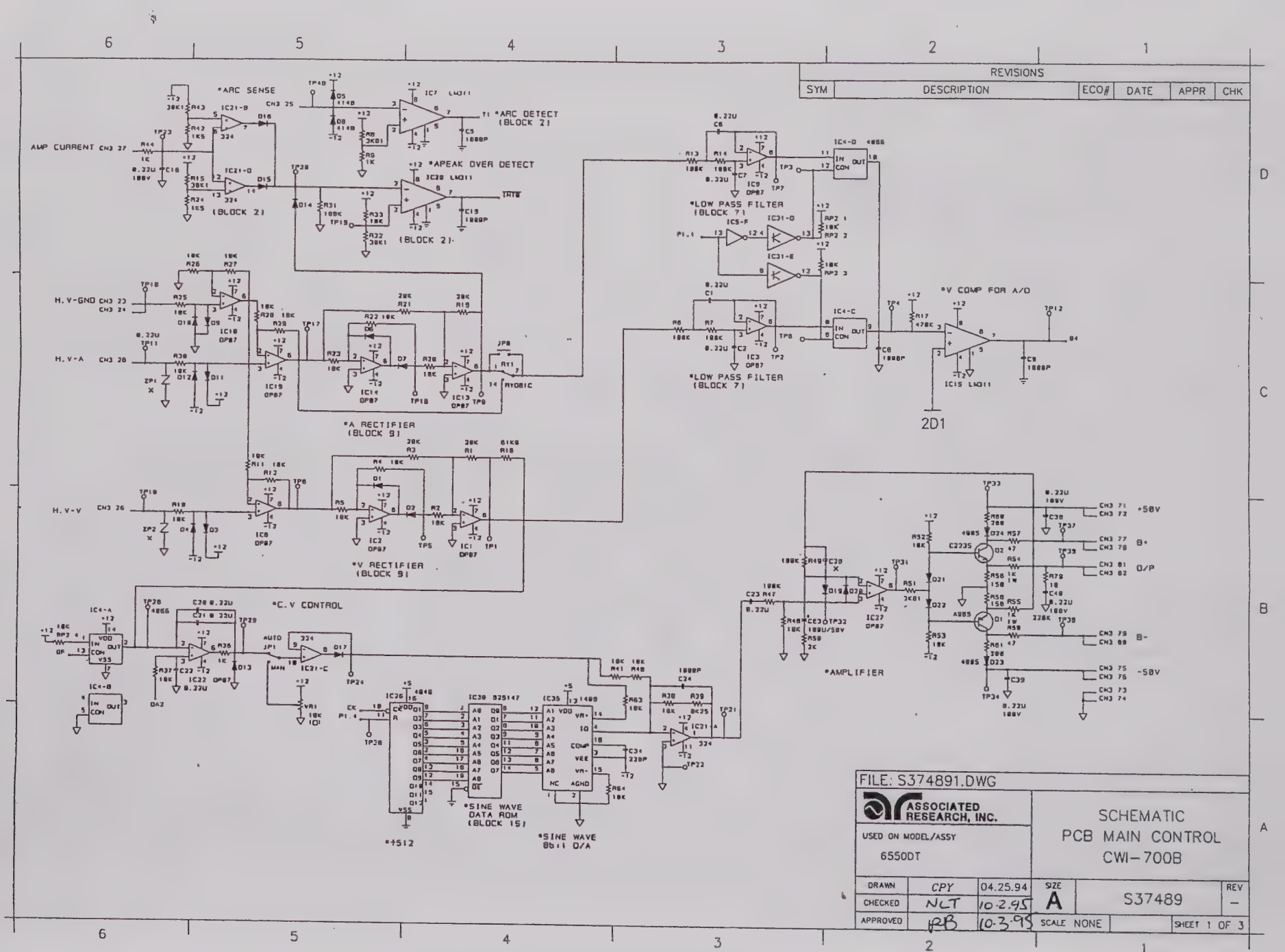
ASSOCIATED RESEARCH, INC.

USED ON MODEL/ASSY: 6550DT

SCHEMATIC
PCB MOTHER BOARD
CWI-OPC

DRAWN	CPY	09.26.95	SIZE A	S37490 REV -
CHECKED	NLT	10.2.95		
APPROVED	RB	10-3-95	SCALE NONE	SHEET 2 OF 3


REVISIONS
SYM | DESCRIPTION | ECO# | DATE | APPR | CHK
RY10
J1 J2
RY9
R27
5K/10W
R32 R31 R30 R29 R28 2M/0.5W
100mH
L2
CN23 1
H.V
CN18 1
D1
HVR3-12
RY8
TP13
R33 R34 R35 R36 R37 2M/0.5W
R26
CN17 4
CN17 5
R28
10K
CN3 26
ARC
VF
C7
X VR1
5K(D)
0.01U
400V
CN17 6
2M/0.5W
R19 R20 R21
HV/IN
C8
0.01U
8KV
C9
R24 R23 R22
3K92 R17
2K R18
C6
220K
22V
ZP5
TP12
ZP4
220K
22V
X C6
CN9 1
56 2
R10 R14
10
R15 R11
20K 4K7
100K
R12 R16
90K9
TP5
100mH
L1
L3
CORE
CN22 2
CN22 1
3.96/2P
RETURN
AF
ZP6
221K
0.01U
CN3 23
CN3 24
RY5
RY8
CN3 28
AC38
3.96/4P
CN7 1
BR1 BD15A
TP1
CN3 71
CN3 72
CN12 3
V+
AC38
CN7 4
0.22U
100V
10000U
63V
CE3
C1
R9
2K/5W
TP7
1
5W
R13
CN3 77
CN3 78
Q2
8863
CN12 2
B+
39
0.5W
R8
3.96/3P
CN12 1
CN7 2
CN7 3
CN3 81
CN3 82
CN13 3
O/P
TP11
RY7
2
1
3
TP20
3.96/4P
CN8 1
CN8 2
5/5W
R5
0.22U
100V
10000U
63V
CE2
C2
R8
2K/5W
CN3 79
CN3 80
Q1
D1148
CN13 2
B-
2.2U
100V
C3
0.05/5W
R4
ZP3
020K
CN8 3
CN8 4
TP6
39
0.5W
R7
V-
CN13 1
3.98/3P
TP3
R3
0.05/5W
TP18
CN3 27
CN3 73
CN3 74
CN3 75
CN3 76
TP2
FILE. S374901.DWG/S374901.GP4
ASSOCIATED RESEARCH, INC.
USED ON MODEL/ASSY
6550DT
SCHEMATIC
PCB MOTHER BOARD.
CWI-OPC
DRAWN CPY 09.26.95
CHECKED NLT 10.2.95
APPROVED RB 10-3-95
SIZE A
S37490
REV -
SCALE NONE
SHEET 1 OF 3


REVISIONS
SYM
DESCRIPTION
ECO#
DATE
APPR
CHK
*ARC SENSE
AMP CURRENT CN3 27
(BLOCK 2)
*ARC DETECT (BLOCK 2)
*PEAK OVER DETECT
(BLOCK 2)
H.V-GND CN3 23
CN3 24
H.V-A CN3 28
*A RECTIFIER (BLOCK 9)
H.V-V CN3 26
*V RECTIFIER (BLOCK 9)
*LOW PASS FILTER (BLOCK 7)
*V COMP FOR A/D
*LOW PASS FILTER (BLOCK 7)
2D1
*C.V CONTROL
*AMPLIFIER
+50V
B+
O/P
B-
-50V
*SINE WAVE DATA ROM (BLOCK 15)
*4512
*SINE WAVE 8bit D/A
FILE: S374891.DWG
ASSOCIATED RESEARCH, INC.
USED ON MODEL/ASSY
6550DT
SCHEMATIC
PCB MAIN CONTROL
CWI-700B
DRAWN CPY 04.25.94
CHECKED NCT 10.2.95
APPROVED WPB 10.3.95
SIZE A
S37489
REV -
SCALE NONE
SHEET 1 OF 3

REVISIONS					
SYM	DESCRIPTION	ECO#	DATE	APPR	CHK

2.54/10P

CN3 97	CN1 1	8.5
CN3 98		
CN3 85	CN1 2	0
CN3 86		
CN3 83	CN1 3	8.5
CN3 94		
CN3 91	CN1 4	17
CN3 92		
CN3 89	CN1 5	0
CN3 90		
CN3 87	CN1 6	17
CN3 88		
CN3 84	CN1 7	17
CN3 88	CN1 8	0
X	CN1 9	X
X	CN1 10	X

2.54/14P

CN3 41	CN18 1	AD7
CN3 42	CN18 2	AD6
CN3 43	CN18 3	AD5
CN3 44	CN18 4	AD4
CN3 46	CN18 5	AD3
CN3 40	CN18 6	AD2
CN3 47	CN18 7	AD1
CN3 48	CN18 8	AD0
CN3 49	CN18 9	EN
CN3 52	CN18 10	A9
CN3 50	CN18 11	A8
CN3 51	CN18 12	VO
CN3 53	CN18 13	+5
CN3 54		
CN3 55	CN18 14	G
CN3 56		

2.54/8P

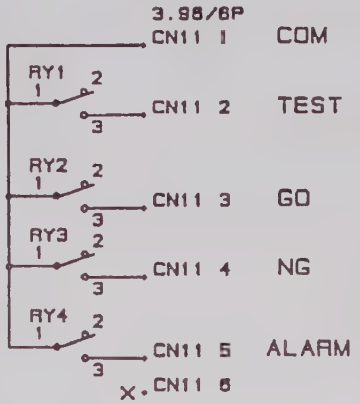
CN3 59	CN17 1	COM2
CN3 60	CN17 2	PG1
CN3 61	CN17 3	PG6
CN3 62	X	

2.54/12P

CN3 13	CN19 1	KEYBOARD IN
CN3 14	CN19 2	
CN3 15	CN19 3	
CN3 16	CN19 4	
CN3 17	CN19 5	KEYBOARD OUT
CN3 18	CN19 6	
CN3 19	CN19 7	
CN3 20	CN19 8	
CN3 21	CN19 9	
CN3 22	CN19 10	
X	CN19 11	
X	CN19 12	

CN3 8	CN20 6	COM1
CN3 9	CN20 5	GO-LED
CN3 10	CN20 4	NG-LED
CN3 11	CN20 3	RMT-LED
CN3 12	CN20 2	LOCK-LED
X	CN20 1 2.54/8P	X

3.96/6P



FILE. S374903.DWG/S374903.GP4

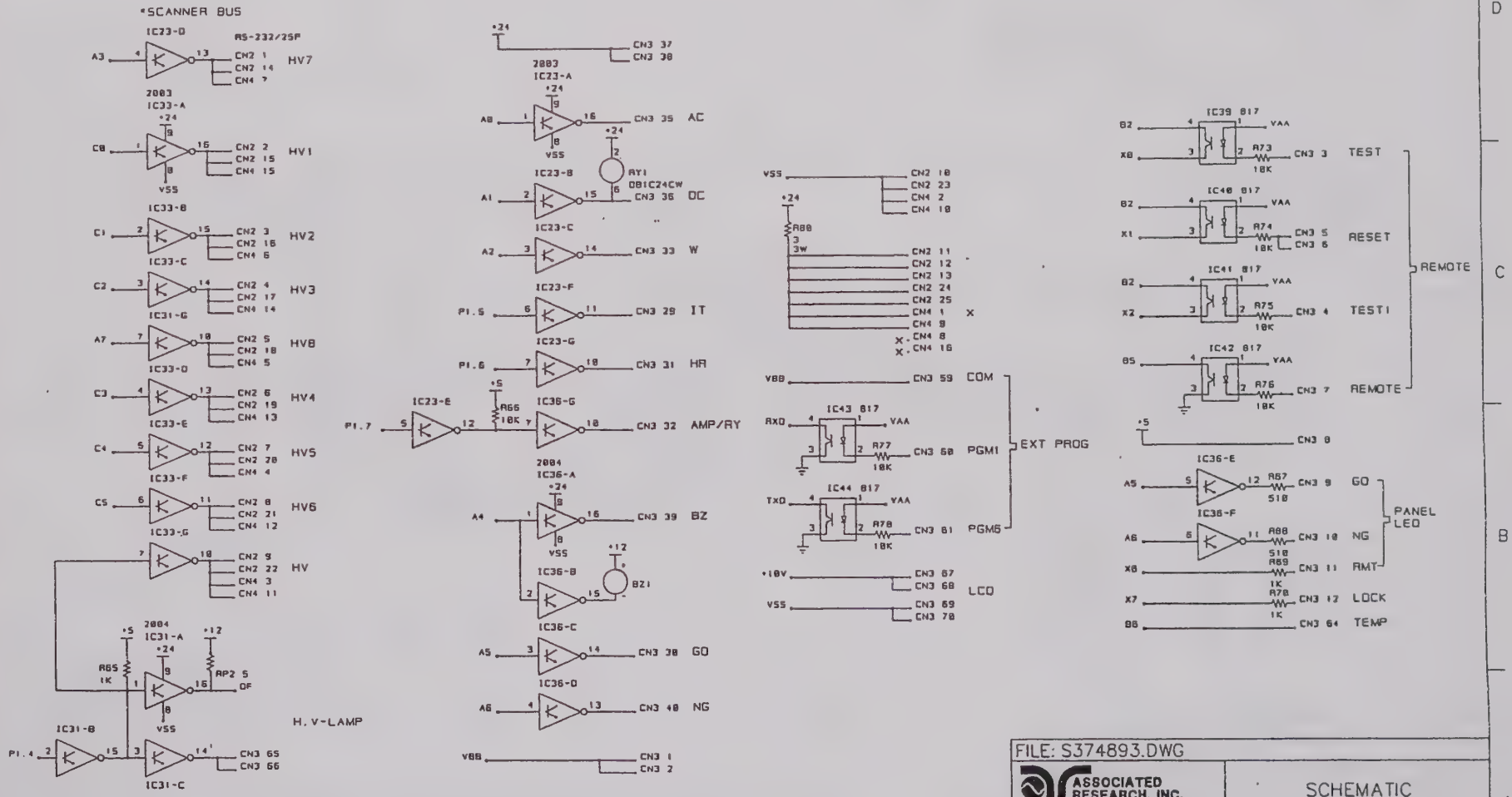
ASSOCIATED RESEARCH, INC.

USED ON MODEL/ASSY
6550DT

SCHEMATIC
PCB MOTHER BOARD
CWI-OPC

DRAWN	CPY	09.26.95	SIZE		REV
CHECKED	NLT	10.2.95	A	S37490	–
APPROVED	RB	10.3.95	SCALE NONE		SHEET 3 OF 3

REVISIONS					
SYM	DESCRIPTION	ECO#	DATE	APPR	CHK



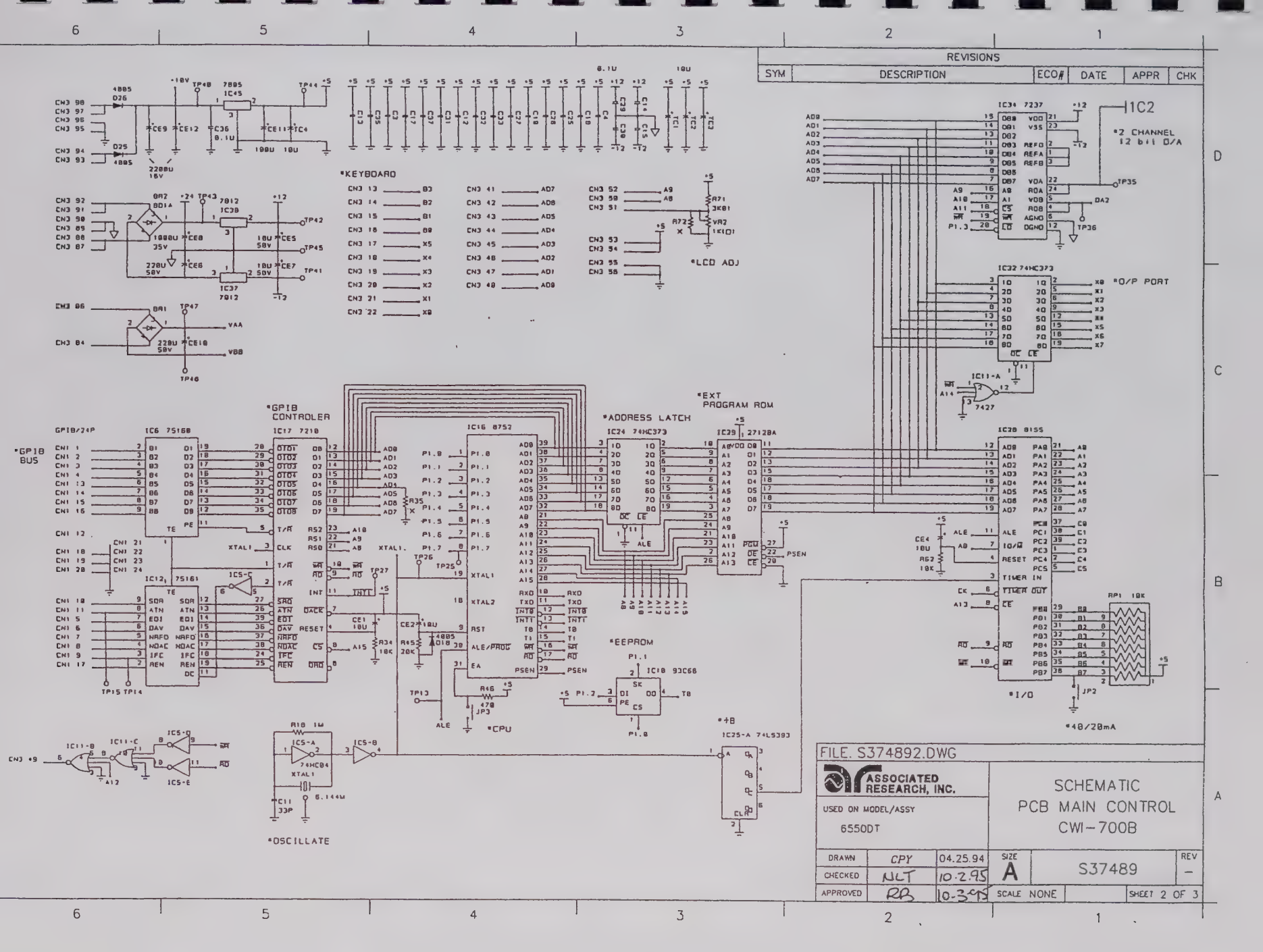
FILE: S374893.DWG

ASSOCIATED RESEARCH, INC.

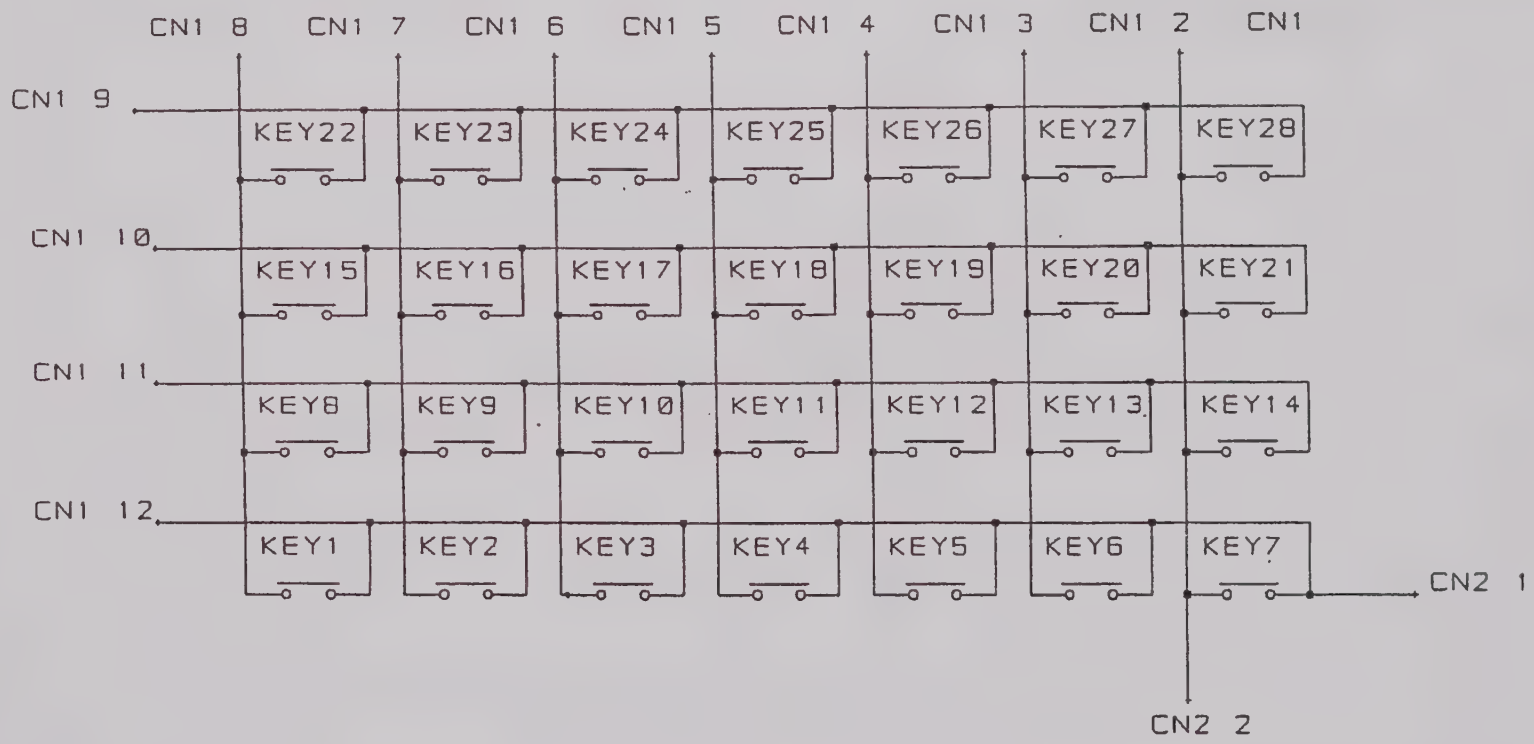
USED ON MODEL/ASSY
6550DT

SCHEMATIC
PCB MAIN CONTROL
CWI-700B

			SIZE		REV
DRAWN	CPY	04.25.94	A	S37489	–
CHECKED	NLT	10.2.95			
APPROVED	RB	10-3-95	SCALE NONE		SHEET 3 OF 3


REVISIONS
SYM | DESCRIPTION | ECO# | DATE | APPR | CHK
*KEYBOARD
*LCD ADJ
*2 CHANNEL 12 bit D/A
*O/P PORT
*EXT PROGRAM ROM
*ADDRESS LATCH
*GPIB CONTROLER
*GPIB BUS
*EEPROM
*CPU
*OSCILLATE
*I/O
*4@20mA
FILE. S374892.DWG
ASSOCIATED RESEARCH, INC.
USED ON MODEL/ASSY
6550DT
SCHEMATIC
PCB MAIN CONTROL
CWI-700B
DRAWN CPY 04.25.94
CHECKED NLT 10-2-95
APPROVED RB 10-3-95
SIZE A
S37489
REV -
SCALE NONE
SHEET 2 OF 3

REVISIONS					
SYM	DESCRIPTION	ECO#	DATE	APPR	CHK



FILE. S37488.DWG/S37488.GP4

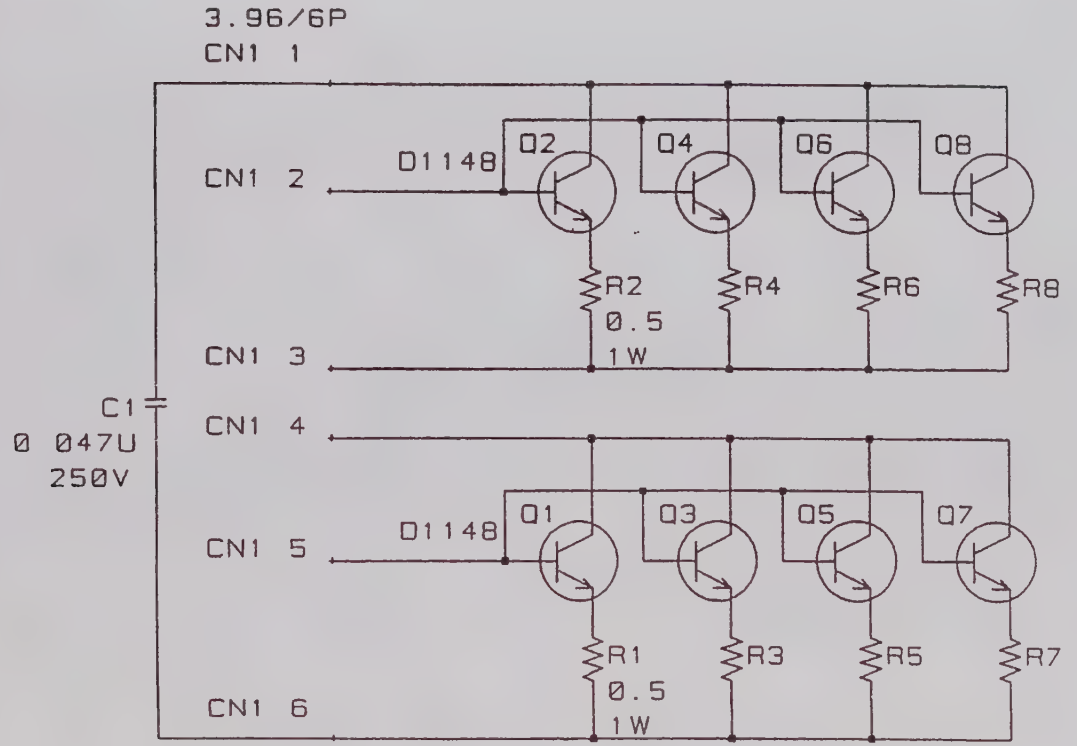
ASSOCIATED RESEARCH, INC.

USED ON MODEL/ASSY
6550DT 6554SA

SCHEMATIC
PCB KEYPAD ASSY
CFP-604A

			SIZE		REV
DRAWN	JPE	04.01.92	A	S37488	-
CHECKED	NLT	9.21.95			
APPROVED	PB	10.3.95	SCALE NONE		SHEET 1 OF 1

REVISIONS					
SYM	DESCRIPTION	ECO#	DATE	APPR	CHK



FILE. S37486.DWG/S37486.GP4

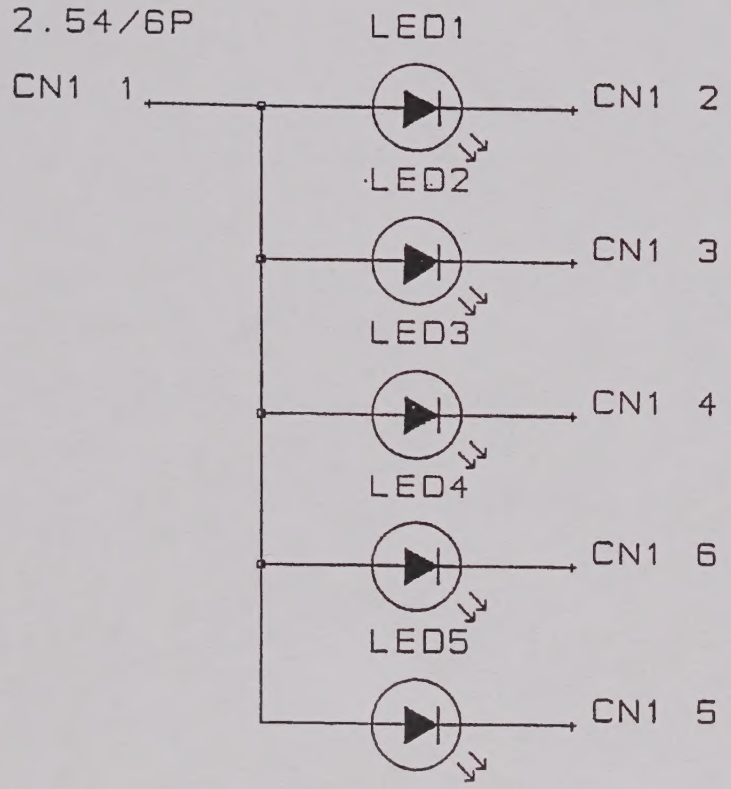
ASSOCIATED RESEARCH, INC.

USED ON MODEL/ASSY: 6550DT

SCHEMATIC
PCB DRIVER BOARD
TR-200

			SIZE		REV
DRAWN	CPY	01.27.94	A	S37486	–
CHECKED	NCT	10.2.95			
APPROVED	RB	10-3-95	SCALE NONE		SHEET 1 OF 1

REVISIONS					
SYM	DESCRIPTION	ECO#	DATE	APPR	CHK



FILE. S37495.DWG/S37495.GP4

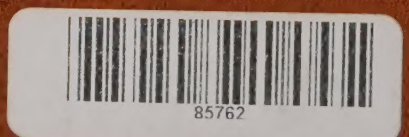
ASSOCIATED RESEARCH, INC.

USED ON MODEL/ASSY
6550DT

SCHEMATIC
PCB LED INDICATOR
DSP-05

DRAWN	CPY	01.27.94	SIZE	S37495	REV
CHECKED	NCT	10 2.95	A		–
APPROVED	RB	10-3-95	SCALE NONE		SHEET 1 OF 1

MP MASTER
MA26210


85762